machinery created by water frame inventor Richard Arkwright for combing and spinning cotton in a single, efficient process. But Slater did not have a copy of the English machines to use as a model. In a remarkable feat of memory, Slater built the complex Arkwright machinery from scratch at a Rhode Island mill.

Slater’s bold move resulted in a big success. In 1793 he built what is known today as Slater’s Mill in Pawtucket, Rhode Island. For his contribution, Slater became known as the Father of American Industry.

Textile mill technology spread rapidly throughout the northeast United States. The mill city of Lowell, Massachusetts, became the jewel of American industry. The mill’s principle founder, Francis Cabot Lowell, used the power of a nearby waterfall to run his machinery. Lowell’s mills, situated in 40 multi-story brick buildings on a network of six miles of canals, were models for modern industry.

Lowell had the world’s first all-in-one mill that took raw cotton through the various processes from fiber to finished cloth. He hired young, single girls from nearby farms to work in the mills, providing good wages and clean, safe housing for them. Some 10,000 workers were employed there by 1850.

Industry Spreads to Europe A British engineer named William Cockerill brought industry to continental Europe. In 1807 he founded a textile factory in Belgium, which became the second industrialized European country after Great Britain.

Political unrest delayed the industrialization of France. In 1789 revolution erupted in France. The Napoleonic Wars further delayed the process. After Napoleon was defeated in 1815 the French government gave financial support for building industry. By 1848 France had become an industrial power.

In Germany, there was no central government to support industry. Railroads were being built, however, among the many small German states. The railroads paved the way for industrialization after about 1850. Treaties that dropped trade barriers among the states also helped industry grow.

Industry in Asia Eventually, industry spread to Asia. Although today Japan is one of the world’s industrial leaders, the Industrial Revolution spread to Japan fairly late. Industrialization took hold there after 1868, when the Meiji government came to power and modernized Japan’s economy. Within just a few decades, Japan had thriving industries.

Japan was far ahead of its Asian neighbors. The industrialization of other major world powers—including China, India, and Russia—would not occur until the 1900s.

Reading Check

How did industrialization in Britain compare to the process in America and Europe?

SECTION 1 ASSESSMENT

Reviewing Ideas, Terms, and People

1. a. Describe What were the factors of production that helped produce an Industrial Revolution in Great Britain?
   b. Identify Cause and Effect What effect did changes in agriculture have on the Industrial Revolution?
   c. Rate Which condition in mid-1700s England do you think was most crucial to the birth of the Industrial Revolution? Explain your answer.

2. a. Identify What did Richard Arkwright invent?
   b. Infer Why did some people not like the arrival of machines?
   c. Predict What effect might the shift from cottages to factories have on the lives of textile workers and on towns and cities?

3. a. Recall What industry stimulated the widespread use of steam engines?
   b. Evaluate How do you think people justified the use of children doing hard labor in coal mines?

4. a. Identify Why is Samuel Slater known as the Father of American Industry?
   b. Draw Conclusions How do you think visitors reacted when they saw the Lowell mills?

Critical Thinking

5. Categorize Use your notes and a graphic organizer like the one below to show how various factors helped start the Industrial Revolution.

<table>
<thead>
<tr>
<th>Factors in the Start of the Industrial Revolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
</tr>
</tbody>
</table>

6. Persuasion Imagine that you are a highly skilled millworker living in Great Britain in about 1800. Write an outline for the main points you would make to government officials to persuade them that you should be allowed to go to the United States to start a textile business.

Answers

Reading Skills possible answer—The previous government took little interest in Japan’s economy.

Reading Check Britain industrialized first, America and Europe benefited from earlier inventions; Lowell factory in Massachusetts was first all-in-one mill; political issues delayed industrial development in continental Europe
Chapter 7

Factories and Workers

Main Idea
The transition from cottage industries changed how people worked in factories, what life was like in factory towns, labor conditions, and, eventually, processes within factories.

Reading Focus
1. How was production organized before factories?
2. What were factories and factory towns like?
3. How did the factory system affect workers?
4. What was mass production, and what were its effects?

Key Terms
- labor union
- strike
- mass production
- interchangeable parts
- assembly line

How did the early Industrial Revolution affect families? In 1795 writer Hannah More told a story about a large family in Lancashire, in northern England. The father worked in the coal mine, and the wife and children worked at home spinning fiber into thread and running a small dairy farm. There was not enough work at home to keep all the children busy, though, so three of them, including nine-year-old Mary, went to work with their father in the coal mine. Gradually the family’s income increased, thanks to the children’s hard work. But tragedy soon struck. The father died in a mine accident, the mother lost her mind from so much grief, and Mary struggled to keep her sisters and brothers fed. Although we do not know if this story of Mary’s family was true, the problems it describes were true for many real families. The early years of the Industrial Revolution brought hardships to many British families, whether they worked in the mines or the factories.

Teach the Main Idea

Factories and Workers

1. Teach Ask students the Reading Focus questions to teach this section.
2. Apply Organize students into pairs. Have each pair create a two-column chart and write short descriptions of production, labor, and family life before and after industrialization.
3. Review As you review the section, have students describe the changes that industrialization brought to individuals, families, workplaces, and towns.
4. Practice/Homework Have students write a series of journal entries from the point of view of a worker who has been forced to switch from a cottage industry to factory work. Alternative Assessment Handbook: Rubric 15: Journals

Academic Vocabulary
Review with students the high-use academic term in this section.
invest to commit money in order to make a financial return (p. 245)
CRF: Vocabulary Builder: Section 2

Taking Notes
where work was done—homes vs. factories; working conditions—comfortable vs. unsanitary and noisy; towns—small towns and villages vs. large cities; labor conditions—direct contact with merchants vs. contact with managers and factory owners; factory processes—required wide range of skills vs. mass production, repetitive tasks
Production before Factories

Production of goods for others did not begin with the Industrial Revolution. Instead, it began many years earlier with cottage industries, when workers produced goods at home.

Work in the Home In cottage industries, workers who produced finished goods dealt directly with merchants. Like other such industries, the manufacturing of textiles followed several steps.

In the first step, a merchant delivered raw materials to the weaver's cottage. In the early textile industry, the raw material was usually wool. Next, the weavers and their families processed the wool in several stages, from raw material to finished product. They hand-spun the fiber into thread and wove the thread into cloth. When the cloth was finished, the merchant picked it up and took it to market.

Work at home had some clear benefits. The weavers controlled their work schedules and product quality. They could work faster when they needed to earn more money. Or, they could work more slowly to make cloth of the highest quality. Also, family life revolved around the business. Weavers made their own decisions on when to work and rest, depending on the family's needs. They could make adjustments for illness, holidays, and the seasons.

Problems for Cottage Industries Even though working in the home had benefits for workers such as weavers, it also had disadvantages. A fire or flood that destroyed the home's equipment could ruin a family in an instant. Also, cloth-making demanded a range of technical skills for the various steps—skills that took a long time to learn. Moreover, only adults had the physical strength that some jobs, such as weaving on a loom, required. The typical home loom was at least six feet wide and required strength to operate. So, if the parents fell ill or died, the children could not take their places. As textile production and then other occupations moved from the cottage to the factory, business owners were able to take advantage of the problems these drawbacks caused for workers.

Factories and Factory Towns

A major change from the cottage industry system to the factory system was where employees worked. A factory laborer had to leave his or her home and work in a place built especially for industry. For some workers, a job in a factory was a welcome way to support the family. For many workers, however, the factory system caused real hardship.

Working in a Factory Factory work was divided into several separate, easily learned tasks, and each worker was assigned to one task. As a result, children could learn jobs as well as adults could. Many families fleeing poverty in the countryside would send their boys and girls—some as young as six years old—to work in the factories. In fact, some factory owners preferred hiring children because they could pay them lower wages. Still, the majority of factory workers were adult men.

Factory work was dangerous for all workers, but children faced special hazards. For example, one problem with early weaving looms was that the threads often snapped. Children, with their small hands, could reach into the still-running machines to retrieve the broken threads more easily than adults. Some children lost fingers in the process. Because there was no safety protection from the massive machines, such severe injuries were common.

The workday was long—more than twelve hours for even very young children. Noise, lack of ventilation, poor sanitation, and inadequate food added to the hardship. Poor factory conditions were common throughout the late 1700s and into the 1800s. In the 1830s, however, the public began to take notice and ask for improvements. Some of the requests came from the child workers:

HISTORY’S VOICES

“We respect our masters, and are willing to work for our support, and that of our parents, but we want time for more rest, a little play, and to learn to read and write. We do not think it right that we should know nothing but work and suffering, from Monday morning to Saturday night, to make others rich. Do, good gentlemen, inquire carefully into our concern.”

—submission from the Manchester’s Factory Children Committee to the House of Commons, 1836

How was production organized before factories? in small cottage industries; a family worked together to produce goods such as cloth or barrels

Production before Factories

Describe What happened after a merchant dropped off wool at a weaver’s cottage? family hand-spun the fiber into thread, wove threads into cloth; merchant picked up cloth, took it to market

Evaluate Would you choose to work in a cottage industry or in a factory? Explain. possible answers—cottage industry: time with family, freedom of work schedule; factory: easier to learn single task, some security in employment

What were factories and factory towns like? factories—often dangerous; work divided into separate, easily-learned tasks; low wages; long hours; factory towns—comprised of shoddily, close-packed company dwellings; polluted; poor sanitation

Factories and Factory Towns

Summarize What hardships were part of factory work? dangerous conditions, long work days, noise, lack of ventilation, poor sanitation, inadequate food

Draw Conclusions Why were children sent to work in factories? Explain. Families desperately needed money; some factory owners preferred hiring children.

Differentiating Instruction

English-Language Learners

Materials: construction paper, colored markers

1. Review with students the information in the text about cottage industries and factory work.

2. Have each student create a two-panel drawing.

   The first panel should feature a family at work in a cottage industry. The second panel should show the same family members after they have begun working in a factory. Encourage students to highlight the differences between the two systems in their drawings. Have students present their drawings to the class.

3. As an extension, have students write a paragraph explaining why the family was forced to switch to factory work.

Answers

Reading Check workers made decisions about when to work, rest, and eat, how much to produce; family could adjust work schedule, all family members could be involved

Artwork
Life in Factory Towns  Factories changed not just the lives of their workers, but also the towns where the factories were located. Along rivers, large mill operations sprang up quickly. Whole towns grew up around the factories. Some companies provided housing to their employees, many of whom arrived from the countryside with few belongings and nowhere to stay. Families crowded into shoddy, close-packed company dwellings.

When water power changed to steam power, manufacturing towns rose near the coal mines also. The hazards of burning coal for producing steam quickly became apparent. Thick soot from the burning coal blanketet towns, turning day into night. The smoke sent sulfur and other poisonous chemicals into the air.

Factories for smelting, or refining, iron were often built near coal mines. They sent more dark, smoky pollution into the air. The iron smelting factories in one region of northwestern England emitted so much pollution that the region was nicknamed “black country.” Because the iron smelting required fires, one American visitor to the region called it “black by day and red by night.”

North of this region lay the textile city of Manchester—the British city that came to symbolize the problems of industrialization. Sanitation statistics provide detail. According to one account, some neighborhoods of Manchester had only two toilets for every 250 residents. Under such conditions, disease spread easily. As a result, about six children in ten died before the age of five.

Identify Supporting Details What are some facts that illustrate the difficulties of factory work?

Primary Source

“How little can the rich man know Of what the poor man feels, When Want like some dark demon foie, Nearer and nearer steals!... He never saw his darlings lie Shivering, the grass their bed; He never heard that maddening cry, ‘Daddy, a bit of bread!’” —“Manchester Song,” quoted by Elizabeth Gaskell in Mary Barton: A Tale of Manchester Life

Differentiating Instruction

Advanced Learners/Gifted and Talented

Materials: butcher paper, art supplies

1. Review the effects that industrialization had on towns such as Manchester.
2. Organize students into small groups. Have each group write an official petition to city officials in Manchester and a petition to Parliament asking for improved conditions within the city. Student petitions should focus on the need for improved sanitation, working conditions, child labor laws, and environmental conditions.
3. Have students share their petitions with the class.
4. Guide students in a discussion of the petitions. Did the petitions address all the needs of Manchester residents and workers?

Answers

Reading Check  injuries, long workdays, noise, lack of ventilation, poor sanitation, inadequate food
The Factory System and Workers

Factories changed more than just families and towns. They also transformed the very nature of labor, as industry moved from the home to the factory.

Workers in a New Economy

The factory system required large amounts of capital, or money, to pay for building the factories and installing the machinery. This produced three main levels of participants within the system:

- wealthy business people to invest in and own the factories
- mid-level employees to run the factories and supervise the day-to-day operations
- low-level employees to run the machines.

Employers who invested their money expected to make a profit. They shared little of their profits with their employees, who were paid only for the hours they worked. At the same time, no one worker was responsible for the product’s quality, and factory workers had little incentive to improve their job performance. Quality could decline.

Also, workers were plentiful. British factories had no trouble finding former farm workers displaced by the enclosure movement. In the United States, immigrants were glad to find any work they could.

Employers often preferred hiring women and children because men expected higher wages. Women were also seen as not taking orders as readily. In addition, many people saw unskilled factory jobs as inappropriate for men. Factory work was seen as “women’s work.”

History Close-Up

Factory Work

Development of Management

Originally, factory owners managed their factories personally. As factories grew and employed more people, one person could no longer supervise so many workers. Management positions were created and many administrative responsibilities fell to managers, who took instructions from owners. The role of managers has grown steadily and now they are an integral part of most industries. People in management positions are often well-paid, highly respected professionals.

About the Illustration

This illustration is an artist’s conception based on available sources. Historians, however, are uncertain exactly what this scene looked like.

Skills Focus: Identifying Problem and Solution

Reading Skill

Company Meeting

Materials: butcher paper, markers

1. Review with students the different levels of employees within the factory system and the working conditions within the factories.

2. Organize students into three groups: business owners, mid-level employees, and lower-level employees. Have each group work together to make a list of complaints to present at the company meeting. Have students write the complaints on butcher paper.

3. Hold a company meeting during class. Have volunteers from each group read its list of complaints to the class.

4. Post the lists for students to see, and guide students in a discussion about whether compromises could be reached on any common issues among the three groups.

Interpersonal, Verbal-Linguistic

Alternative Assessment Handbook, Rubrics 14: Group Activity; and 35: Solving Problems

Answers

History Close-Up: poor ventilation, machine-related injuries, punishment from foremen, bone deformation; tasks separated by floor

ACADEMIC VOCABULARY

invest: to commit money in order to make a financial return

CRF: Literature: Hard Times
Cottage Workers’ Unrest One group of people faced a particular challenge caused by the factory system. These were the weavers and other cottage industry workers still trying to earn their living by making goods at home. Their handmade goods were more expensive than factory-made items, so they had a hard time selling them. Facing ruin, some of these workers turned to violence.

One night in 1811, masked workers attacked a textile factory in Nottingham, England. The incident marked the beginning of the Luddite movement. The Luddites, named after a General Ned Ludd who probably did not exist, opposed machines that were “hurtful to the commonality”—in other words, that put them out of work. Luddites burned factories and smashed machines but tried to avoid injuring people. During 1812 the movement quickly spread to other cities. Several Luddites were caught and hanged, though, and the Luddite movement ended quickly.

Changing Labor Conditions The severe treatment of the Luddites illustrates that the British government did not want to get involved in factory problems. Government leaders did not see regulating business as their job. Many citizens thought that if the government helped poor people too much, they would lose their incentive to work harder. As a result, the government did not pass laws relating to work hours, safety, or child labor.

Because the government took no action, in the early 1800s British workers started to organize. They formed the first labor unions, which are organizations representing workers’ interests. To urge employers to raise wages and improve conditions, unions in Britain organized strikes, or work stoppages. At first, Parliament banned unions and strikes, fearing social and economic trouble. Slowly, pressure from the public and unions brought change. Hearings in Parliament in 1832 produced the Sadler Report, which described abuses in the factories. Eventually Britain passed laws that limited work hours for adults and children. Another law required child workers to be at least nine years old. In 1871 Parliament legalized labor unions.

American workers also organized. In the United States, the first nationwide labor unions developed in the mid-1800s.

A New Class of Workers While factory conditions were slowly improving, another process was also taking place—the growth of the middle class. The middle class included the various groups, or types, of workers that were in the middle income range, between the rich factory owners and the poor factory workers. Several groups of workers who were essential to the factory system became part of the middle class. Managers and accountants kept...
the factories running and their books balanced. Engineers designed the machines, and mechanics kept them in good repair. Other workers transported the goods to market while still others were engaged in sales of those goods. As the income from increased manufacturing, buying, and selling spread throughout the economy, more people entered the middle class.

**Reading Focus**

How did the factory system affect different groups?

**Factories and Mass Production**

The factory system certainly changed the world of work. In addition, new processes further changed how people worked in factories and what they could produce.

**The Process of Mass Production**

Many changes in industry evolved fully in the United States. One of these changes was the development of mass production—the system of manufacturing large numbers of identical items. Elements of mass production, including interchangeable parts and the assembly line, came to be known as the American system.

**Interchangeable parts** are identical machine-made parts. They made production and repair of factory-made goods more efficient. Before industrialization, one skilled worker might have made an entire gun, clock, or other product by himself. He would make or gather all the parts and assemble them. The process could be slow, and because the parts were all handmade, the finished products were a little different from each other. With interchangeable parts, though, one worker could put together many identical products in a short time. Making repairs was easier, too, because replacement parts did not have to be custom-made to fit.

The other element of mass production related to movement within factories. In early workshops, the product stayed in one place and workers moved around it, adding parts and making refinements. An innovation was the **assembly line**. In an assembly line, the product moves from worker to worker, as each one performs a step in the manufacturing process. With this division of labor, workers can make many items quickly.

**Effects of Mass Production**

Mass production had advantages and disadvantages. A big advantage was a dramatic increase in production. Businesses that made many items quickly could charge less per item. As a result, more people could afford to buy these mass-produced goods.

For employees, however, mass production could lead to more repetitious jobs. At first, some workers protested, refusing to work quickly. But the changes could not be stopped, and mass production became the norm in factories.

**Summary**

What was mass production?

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**Section 2 Assessment Answers**

1. a. merchant brought wool to cottage, weaver made cloth, merchant took cloth to market  
   b. advantage—worker could adjust schedule; disadvantage—fire or floods
2. a. chemicals, pollution, poor sanitation  
   b. could be injured while using machines  
   c. had no other way to make a living
3. a. business owner at top, mid-level employees, regular employees at bottom  
   b. business owners who cared only about making a profit, willing workers were plentiful  
   c. Unions and strikes were illegal.
4. a. interchangeable parts, assembly line  
   b. allowed for increased production, lower prices, increased sales
5. advantages—increased production, lower prices, availability of products; disadvantages—harsh working conditions, pollution, child mortality, ended cottage industries; factory owners: most; employees: least
6. Student paragraphs or essays should convey the effect of industry on English towns.

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**Factories and Mass Production**

Describe How was a product made before the development of interchangeable parts? One skilled worker made the entire product; as a result, each finished product was slightly different.

Make Inferences Why do you think some workers resisted mass production? possible answer—Working in factories might have been boring and repetitive.

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**Close**

Have students explain how the factory system led to changes in all aspects of people’s lives.

**Review**

- **Online Quiz**, Section 2

**Assess**

- **Section 2 Assessment**
- **Progress Assessment**: Section 2 Quiz
- **Alternative Assessment Handbook**

**Reteach/Intervene**

- Interactive Reader and Study Guide, Section 2
- Interactive Skills Tutor CD-ROM

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**Answers**

- **Reading Check** a system of manufacturing large numbers of identical items