SECTION 1

Step-by-Step Instruction

Objectives
As you teach this section, keep students focused on the following objectives to help them answer the Section Focus Question and master core content.

- Analyze why life changed as industry spread.
- Summarize how an agricultural revolution led to the growth of industry.
- Outline the new technologies that helped trigger the Industrial Revolution.

Prepare to Read

Build Background Knowledge

Write the word revolution on the board. Ask students to list revolutions they have studied (including the Scientific Revolution) and the characteristics of revolutions. Tell them they will learn about the characteristics of the Industrial Revolution next.

Set a Purpose

- **WITNESS HISTORY** Read the selection aloud or play the audio. (Answer appears with Section 1 Assessment questions.)

Ask What effect did Boulton think steam power would have on the world? (It would benefit people by relieving them of hard manual labor.) Ask students to predict whether steam power would “uplift civilization.”

Focus Point out the Section Focus Question and write it on the board. Tell students to refer to this question as they read. (Answer appears with Section 1 Assessment answers.)

Preview Have students preview the Section Objectives and the list of Terms, People, and Places.

Reading Skill Have students use the Reading Strategy: Understand Effects worksheet.

Vocabulary Builder

Use the information below and the following resources to teach the high-use word from this section.

**High-Use Word**

**Definition and Sample Sentence**

*Statistics,* p. 619

<table>
<thead>
<tr>
<th>High-Use Word</th>
<th>Definition and Sample Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. data that is gathered and tabulated to present information</td>
</tr>
<tr>
<td></td>
<td>The statistics from this season’s basketball games showed that Jenny had scored more points than any other player</td>
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Life Changes as Industry Spreads

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.

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.

**Focus Question** What events helped bring about the Industrial Revolution?

Dawn of the Industrial Age

For thousands of years following the rise of civilization, most people lived and worked in small farming villages. However, a chain of events set in motion in the mid-1700s changed that way of life for all time. Today, we call this period of change the Industrial Revolution.

The Industrial Revolution started in Britain. The economic changes that Britain experienced affected people’s lives as much as previous political changes and revolutions had. In contrast with most political revolutions, it was neither sudden nor swift. Instead, it was a long, slow, unseen process in which production shifted from simple hand tools to complex machines. From its beginnings in Britain, the Industrial Revolution has spread to the rest of Europe, North America, and around the globe.

Industrial Revolution

Matthew Boulton

From Hand Power to Steam Power

For centuries, people used their own energy to provide the power for their work. While the idea of using steam power came about in the seventeenth century, it was not until engineer James Watt improved the steam engine that it could be applied to machinery. His financial partner Matthew Boulton, a successful manufacturer, proclaimed “I have at my disposal what the whole world demands, something which will uplift civilization more than ever by relieving man of all undignified drudgery. I have shown power.”

**Focus Question** What events helped bring about the Industrial Revolution?
Industrial-age travelers moved rapidly between countries and continents by train or steamship. Urgent messages flew along telegraph wires. New inventions and scientific “firsts” poured out each year. By 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 dying in childbirth.

Still more stunning changes occurred in the next century, which created our familiar world of skyscraper cities and carefully tended suburbs. 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 in Europe but today includes many more.

**Checkpoint**: Why was the Industrial Revolution a turning point in world history?

### Agriculture Spurs Industry

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

#### Farming Methods Improve

The Dutch led the way in this new agricultural revolution. They built canals and dikes to reclaim land from the sea. They also combined smaller fields into larger ones to make better use of the land and used fertilizers to promote growth. New agricultural journals were created, and farmers shared their knowledge through correspondence and journals.

#### Crop Rotation

Farmers turned to crop rotation, which was a practice of growing different crops in the same area in different years. This helped to restore exhausted soil. Jethro Tull, a British farmer, invented a new mechanical device, the seed drill, to aid farmers. It deposited seeds in rows rather than scattering them wastefully over the land.

*Image: Jethro Tull's seed drill*

**Graph Skills**: According to the graph, between which years was the largest percentage of land enclosed? What was the result of these land enclosures?

- **Value Added**: Oxford Atlas of World History
- **Toolkit**: Guided Questioning (TE, p. T20)
- **Media**: Investigate the flowchart, see货单. Use the following resources to help students acquire basic skills:
  - Adapted Reading and Note Taking Study Guide
  - Adapted Note Taking Study Guide
  - Adapted Section Summary

### Independent Practice

Ask students to write a brief paragraph that explains how the practice of enclosures helped lead to the Industrial Revolution. They should use details from the text and from the bar graph on this page.

### Graph Skills

- **Between 1800 and 1750**
- **Between 1750 and 1800**
- **Between 1800 and 1815**
- **Between 1815 and 1825**
- **Between 1825 and 1835**
- **Between 1835 and 1845**
- **Between 1845 and 1855**
- **Between 1855 and 1865**

### Solutions for All Learners

- **Special Needs**: Help students brainstorm ways that they use machines and machine-made items every moment of their lives, from the time they turn on the alarm clock until they turn off the lights at night. Then ask them to summarize what aspects of life were changed by the Industrial Revolution.

- **Less Proficient Readers**: Use the following resources to help students acquire basic skills:

  - Adapted Reading and Note Taking Study Guide
  - Adapted Note Taking Study Guide
  - Adapted Section Summary

**Answers**

- The Industrial Revolution changed where and how people lived and how they worked and traveled.
New Technology Becomes Key

Instruct

■ Introduce Point out that the way we think of technology is a product of the Industrial Revolution. Use the Think-Write-Pair-Share Strategy (TE, p. T22) and Ask Was technology a cause or a result of the Industrial Revolution? Why? (both; answers will vary.)

■ Teach Ask Which two developments helped start the Industrial Revolution? (improvements to the steam engine and to iron production) How did these two technologies influence each other? (Better-quality iron was used to build steam engines; steam engines produced new uses for iron, such as locomotives)

■ Quick Activity Display Color Transparency 116: Steam-Powered Inventions. Ask students to list what kinds of changes each invention led to. Then return to the Witness History quotation from Matthew Boulton, from the beginning of this section. Have students debate whether they agree or disagree with Boulton’s statement that steam power will “uplift civilization”, using the evidence in the chart.

Independent Practice

Assign student groups to research one of the following inventors and his contributions to the Industrial Revolution: Henry Cort, Robert Fulton, John McAdam, Samuel Morse, George Stephenson, or John Wilkinson. Have the groups present their findings to the class.

Monitor Progress

■ Point out the photos of the bridge completed by Abraham Darby III. To review the section so far, have students explain the significance of Darby’s experiments with coal.

■ Check Reading and Note Taking Study Guide entries for student understanding.

Answers

Because of an agricultural revolution, people ate better and were healthier, which reduced death rates.

BIOGRAPHY Sample: Watt’s improved steam engine might not have been marketed right away, which could have meant a delay in the spread of the Industrial Revolution.

610 The Industrial Revolution Begins

Enclosure Increases Output but Causes Migration Meanwhile, rich landowners pushed ahead with enclosures, the process of taking over and consolidating land formerly shared by peasant farmers. In the 1500s, landowners had enclosed land to gain more pasture for sheep to increase wool output. By the 1700s, they wanted to create larger fields that could be cultivated more efficiently. The British Parliament facilitated enclosures through legislation. As millions of acres were enclosed, farm output rose. Profits also rose because large fields needed fewer workers. But each progess had a large 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. Villagers shrank as cottagers left in search of work. In time, jobless farm workers migrated to towns and cities. There, they formed a growing labor force that would soon bend the machines of the Industrial Revolution.

Population Multiplies The agricultural revolution contributed to a rapid growth of population. 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.

Why did this population increase occur? First, the agricultural revolution reduced the risk of death from famine because it created a surplus of food. Since people ate better, they were healthier. Also, better hygiene and sanitation, along with improved medical care, further slowed deaths from disease.

Checkpoint How did an agricultural revolution contribute to population growth?

Watt, Horsepower, and Watts By preventing the loss of steam, Watt made steam engines more efficient and more powerful. He also attached a flywheel, converting the back-and-forth motion of the pistons into a circular motion to power not only pumps but all sorts of machinery. To market his engines, Watt needed to be able to describe their power. The best source of power at the time was horses. Watt found that a horse could lift 550 pounds of coal 10 feet (3 m) in 10 seconds, or 33,000 pounds per foot (0.3 m) per minute. He defined this value as one horsepower. Horsepower is still used for engines; trucks and SUVs today average more than 200 horsepower. Watt’s name was later given to a measure of power: the watt. Common light bulbs measure 60 to 100 watts. One horsepower is equal to 745.56 watts.
Writing About History

Abraham Darby used coal instead of charcoal to pioneer new methods of producing iron. In 1709, steam engines. The Darby family of Coalbrookdale material needed for the construction of machines and vital source of fuel in the production of iron, a key power source of the Industrial Revolution. The steam engine opened the door not only to operating machinery but eventually to powering locomotives and steamships.

The Quality of Iron Improves 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 pioneered new methods of producing iron. In 1709, Abraham Darby used coal instead of charcoal to smelt iron, or separate iron from the ore.

Darby’s experiments led him to produce less expansive 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 more and more widely, especially after the world turned to building railroads.

An Energy Revolution During the 1700s, people began to harness new sources of energy. One vital power source was coal, used to develop the steam engine. In 1712, British inventor Thomas Newcomen had developed a steam engine powered by coal to pump water out of mines. Scotland engineer James Watt looked at Newcomen’s invention in 1764 and set out to make improvements on the engine in order to make it more efficient.

Watt’s efforts, after several years of work, would become a key power source of the Industrial Revolution. The steam engine opened the door not only to operating machinery but eventually to powering locomotives and steamships.

James Watt

Watson’s improved steam engine and better-quality iron helped trigger the Industrial Revolution.

2. Reading Skill: Recognize Multiple

For each term, person, or place listed at the beginning of the section, write a sentence explaining its significance.

3. Recognize Multiple

Cause

Use your completed flowchart to answer the Focus Question: What caused the Industrial Revolution? Have them research and write reports expressing their opinions, supported by relevant examples.

Answer

Long-term effects included population growth and migration of workers to cities.

4. Predict Consequences

How do you think population growth contributed to the Industrial Revolution?

5. Summarize

Explain how new sources of energy, specifically coal, contributed to the Industrial Revolution.

4. Predict Consequences

To further assess student understanding, use Progress Monitoring Transparencies, 79

Retreat

If students need more instruction, have them read the section summary.

Assess and Reteach

Assess Progress

- Have students complete the Section Assessment.

- Administer the Section Quiz.

Teaching Resources, Unit 4, p. 41

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