



# The Age of Revolution

## TERMS & NAMES

Scientific Revolution  
 Industrial Revolution  
 labor force  
 capitalism  
 French Revolution  
 Reign of Terror  
 Napoleon Bonaparte

### MAIN IDEA

Scientific, industrial, and political revolutions transformed European society.

### WHY IT MATTERS NOW

European revolutions in science, technology, and politics helped to create modern societies throughout the world.

## DATELINE

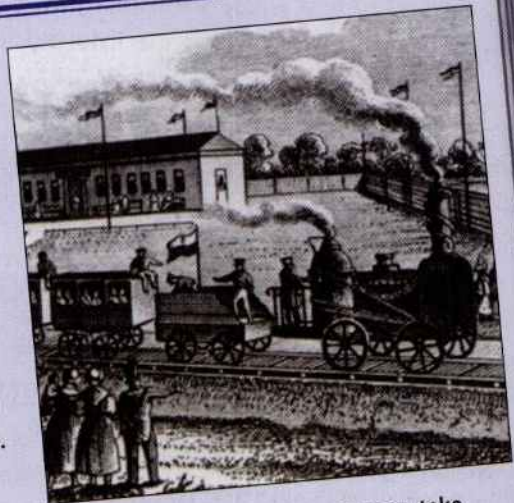


### LEIPZIG, GERMANY, APRIL 1839

A new era in German history has begun. The Leipzig-Dresden railway is open for business. Although short rail lines have been in service for a few years, this is the first long-distance railway in this part of Europe.

The steam locomotive that powers the German train was made in England. It is the latest improvement to

George Stephenson's "Rocket" train, which set a speed record of 30 mph in 1829. Already, this new form of transportation is changing Europe. The railroads are attracting many passengers and are also ideal for hauling goods. It seems that wherever new train stations are built, growth and prosperity soon follow.



**Region** • Leipzig's railway will now take passengers all the way to Dresden. ▲

## Changes in Science and Industry

The steam-powered locomotive was only one in a long line of technological improvements made in Europe since the 1600s. In fact, scientists and inventors made so many discoveries during these years that Europe experienced both a scientific and an industrial revolution. These periods of great change would help to create modern societies.

### TAKING NOTES

Use your chart to take notes about people and ideas.

| Influences           | New Ideas | People/Achievements |
|----------------------|-----------|---------------------|
| The Renaissance      |           |                     |
| European Exploration |           |                     |



**The Scientific Revolution** In the 16th and 17th centuries, scientific discoveries changed the way Europeans looked at the world. This led to the **Scientific Revolution**.

In Italy, Galileo Galilei (GAL•uh•LEE•oh GAL•uh•LAY) (1564–1642) studied the stars and planets using a new invention called the telescope. Later in Holland, Antoni van Leeuwenhoek (LAY•vuh•huk) (1632–1723) used a microscope to explore an unknown world found in a drop of water. The Swedish botanist Carolus Linnaeus (lih•NEE•uhs) (1707–1778) even developed a system to name and classify all living things on Earth.



**Culture •**  
In 1610, Galileo used his telescope to observe that Jupiter had moons. ▲

## The WORLD'S HERITAGE

**The Scientific Method** During the Scientific Revolution, scientists began doing research in a new way, called the scientific method. This scientific method is still used by scientists today.

First, scientists identify a problem. Next, they collect data about the problem. Using this data, they develop an explanation for the problem and test the explanation by performing experiments. Finally, they reach a conclusion.

**The Industrial Revolution** Many inventions of the Scientific Revolution began to change the way people worked all across Europe. Machines performed jobs that once had been done by humans and animals. This brought about such great change that it led to a revolution in the way goods were produced: the **Industrial Revolution**.

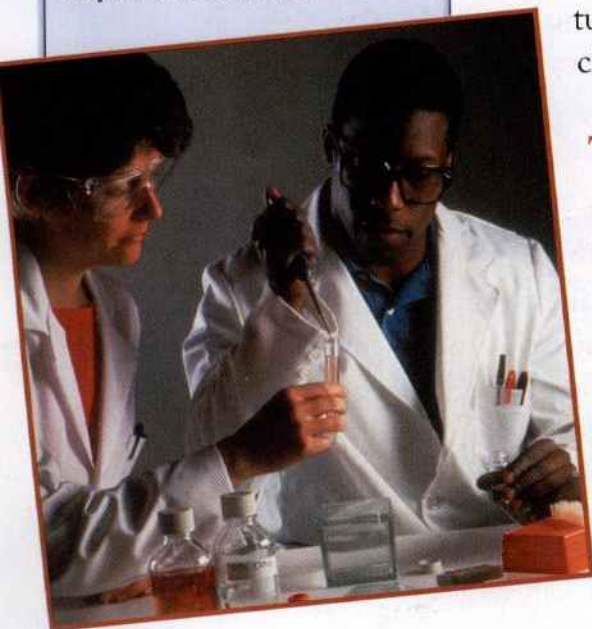
Machines were grouped together to make products in large factories. Early factories were built in the countryside near streams and rivers so that they could be powered by water. By the late 1700s, however, new steam engines were used to power the machinery. More and more factories could now be built in cities. People, in turn, moved from the countryside to the cities in search of work.

### Reading Social Studies

**A. Finding Causes**  
How did the Scientific Revolution lead to the Industrial Revolution?

## The Workshop of the World

The Industrial Revolution began in England in the late 1700s. The first English factories made textiles, or cloth. The steam-powered machines of the textile industry produced large amounts of goods quickly and cheaply. So many factories were built in England that the country earned the nickname “The Workshop of the World.”





## BACKGROUND

In the 1850s, laws were finally passed to help protect women and children from long hours and harsh working conditions.

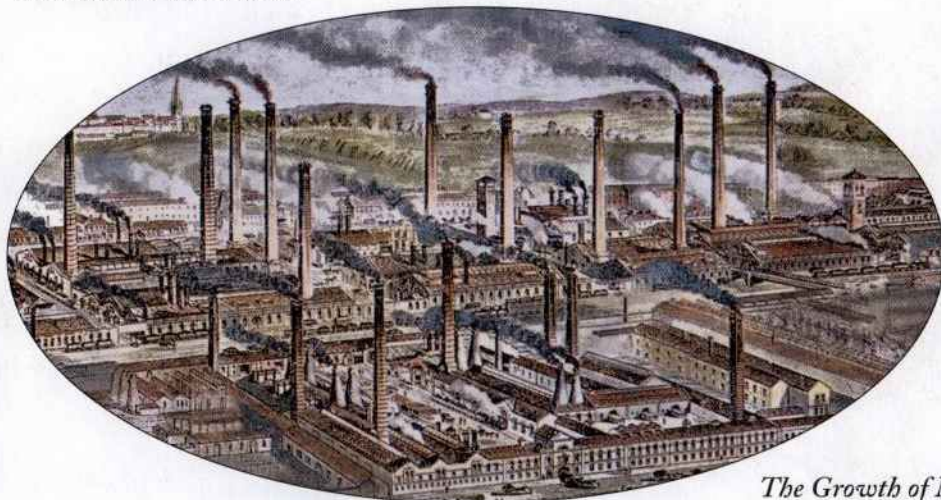
**Hard Work for Low Pay** The Industrial Revolution created a need for workers, or a **labor force**, in cities. The workers who ran the textile machines made up part of this labor force. Most workers could earn more income in cities than on farms, but life could be hard. Factory laborers worked long hours and received low pay. In fact, many families often sent their children to work to help create more income.

In 1838, women and children made up more than 75 percent of all textile factory workers. Children as young as seven were forced to work 12 hours a day, six days a week.

## The Spread of Industrialization

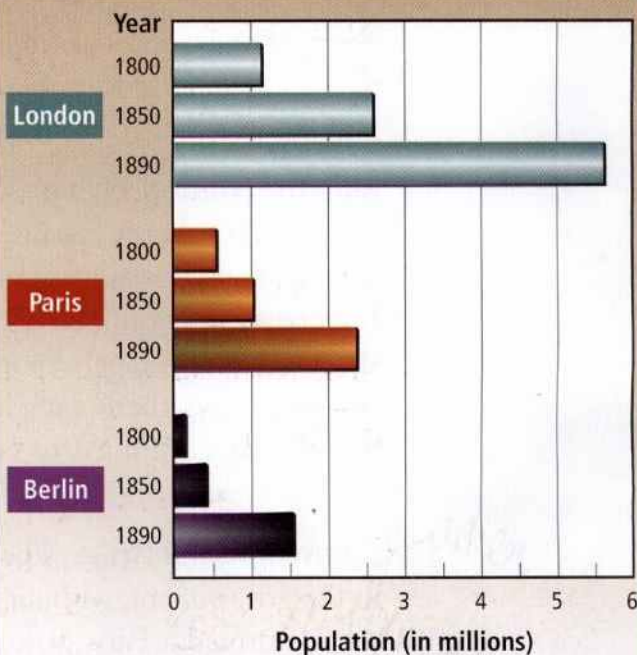
The textile industry in 18th-century England was one step in the development of an economic system called **capitalism**. In this system, factories and other businesses that make and sell goods are privately owned. Private business owners make decisions about what goods to produce. They sell these goods at a price that will earn a profit.

Industrialization spread from England to other countries, including Germany, France, Belgium, and the United States. Cities in these countries grew rapidly and became more crowded and dirtier. Diseases, such as cholera (KAHL·uhr·uh) and typhoid (TY·foyd) fever, spread. Smoke from factories blackened city skies, and pollution fouled the rivers.



**Place** • Factories, like this one in Sheffield, England, were found throughout Western Europe by the mid-19th century. ▶

## Population Growth in European Cities



### SKILLBUILDER: Interpreting a Chart

1. Which city had the largest growth in population?
2. What was the population of Paris in 1890?



# The French Revolution

Along with changes in science, technology, and the economy came new ideas about government. In the late 18th century, many ordinary citizens began to fight for more political rights.

**Ripe for Political Change** By the 1780s, the French government was deeply in debt because of bad investments and the costs of waging wars. Life was miserable for the common working people. Poor harvests combined with increased population had led to food shortages and hunger. People were forced to pay heavy taxes. At the same time, the French king, Louis XVI, and his queen, Marie Antoinette, continued to enjoy an expensive life at court, entertaining themselves and the French nobility.

**Storming the Bastille** The citizens of France demanded changes in the government, without success. Then, on July 14, 1789, angry mobs stormed a Paris prison called the Bastille (ba•STEEL). The attack on this prison, which reflected the royal family's power, became symbolic of the **French Revolution**.

Revolts spread from Paris to the countryside, and poor and angry workers burned the homes of the nobility. By 1791, France had a new constitution that made all French citizens equal under the law.

**Region** • The storming of the Bastille remains a symbol of the French Revolution. ▼

## Reading Social Studies

### B. Analyzing Motives

Why did the French citizens demand a new government?





## BACKGROUND

Until the French Revolution, the guillotine was only used to execute nobles. It was considered the most humane type of execution.

**The French Republic** In 1792, France became a republic. King Louis XVI was found guilty of treason, or betraying one's country. In 1793, he and Marie Antoinette were sentenced to death. They were beheaded on the guillotine (GIHL•uh•teen).

Still, France was not at peace. The new revolutionary leaders refused to tolerate any disagreement. Between 1793 and 1794, these new leaders executed 17,000 people. This period of bloodshed became known as the **Reign of Terror**.

**Napoleon** French leaders continued to struggle for power until 1799, when General **Napoleon Bonaparte** (nuh•POH•lee•uhn BOH•nuh•PAHRT) took control. The French Revolution and the disorder that followed were finally over.

However, the new sense of equality brought about by the Revolution stirred feelings of nationalism among the French. Nationalism is pride in and loyalty to one's nation. Soon, the citizens of other European nations began to fight for more political power. Slowly, they, too, won more rights.



**Region •** Napoleon Bonaparte crowned himself emperor of France in 1804. He led France to victory in what became known as the Napoleonic Wars. ▲

## SECTION 3 ASSESSMENT

### Terms & Names

1. Explain the significance of:
- |                           |                           |                        |                |
|---------------------------|---------------------------|------------------------|----------------|
| (a) Scientific Revolution | (b) Industrial Revolution | (c) labor force        | (d) capitalism |
| (e) French Revolution     | (f) Reign of Terror       | (g) Napoleon Bonaparte |                |

### Using Graphics

2. Use a chart like this one to list some of the scientific, industrial, and political changes that occurred during the Age of Revolution.

| Scientific Changes | Industrial Changes | Political Changes |
|--------------------|--------------------|-------------------|
|                    |                    |                   |

### Main Ideas

3. (a) Describe at least three inventions or discoveries of the Scientific Revolution.
- (b) How did the Industrial Revolution change the way people in Europe worked?
- (c) What changes occurred in France after the French Revolution?

### Critical Thinking

#### 4. Recognizing Effects

How did industrialization change the cities to which it spread?

#### Think About

- population
- diseases
- the environment

## ACTIVITY -OPTION-

Reread the section about the French Revolution. Write a **poem** or **lyrics** for a folk song that describe the events from the point of view of a common citizen or a member of the royal family.