

# Reading Essentials and Study Guide



## Industrialization and Nationalism, 1800–1870

### Lesson 1 The Industrial Revolution

#### ESSENTIAL QUESTIONS

*How can innovation affect ways of life? How does revolution bring about political and economic change?*

#### Reading HELPDESK

##### Academic Vocabulary

**labor** people with all their abilities and efforts performed by people that provides the goods or services in an economy

**derived** obtained from; came from

##### Content Vocabulary

**capital** money available for investment

**entrepreneur** a person who finds new business opportunities and new ways to make profits

**cottage industry** a method of production in which tasks are done by individuals in their rural homes

**puddling** the process in which coke derived from coal is used to burn away impurities in crude iron to produce high quality iron

**industrial capitalism** an economic system based on industrial production or manufacturing

**socialism** a system in which society, usually in the form of the government, owns and controls the means of production

#### TAKING NOTES: *Categorizing*

**ACTIVITY** As you read, use a table like the one below to name important inventors mentioned in this section and their inventions.

Inventors	Inventions

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## Industrialization and Nationalism, 1800–1870

### Lesson 1 The Industrial Revolution, *continued*

#### IT MATTERS BECAUSE

The Industrial Revolution began in Great Britain during the late eighteenth century. Before that time, the economy had been based on farming and goods made by hand. An agricultural revolution and industrialization caused major changes in the economy. Now it was based on manufacturing by machines in factories.

#### The Industrial Revolution in Great Britain

**Guiding Question** *What was the significance of the Agricultural Revolution in Great Britain? Why did the Industrial Revolution start in Great Britain?*

The Industrial Revolution began in Great Britain in the 1760s. The revolution took many decades to spread to other Western nations. Many reasons help explain why Great Britain was the starting place of the revolution.

First, there was an Agricultural Revolution in Great Britain in the 1700s. It changed agricultural practices. Expansion of farmland, good weather, improved transportation, and new crops such as the potato increased the food supply. More people could be fed at lower prices with less **labor**. Now even ordinary British families could use some of their income to buy manufactured goods, such as clothing, buttons, shoes, and household items like dishes, clocks, and mirrors.

Second, the increased food supply caused the population to grow. Landowners fenced off common lands when Parliament passed enclosure movement laws in the 1700s. This forced many peasants to move to towns and created a labor supply for factories.

Third, Britain had money, or **capital**, to invest in new machines and factories. **Entrepreneurs** found new business opportunities. They also found new ways to make profits.

Fourth, Britain had many natural resources. The country's rivers provided water power for the new factories and a way for transporting raw materials and finished products. Britain also had large supplies of coal and iron ore.

Finally, Britain had markets where British manufacturers could sell their goods. Britain had a large colonial empire, and British ships could transport goods anywhere in the world. Also, domestic markets increased because of population growth and cheaper food at home. A growing demand for cotton cloth led British manufacturers to look for ways to increase production.

#### Cotton Production and New Factories

Great Britain produced a large amount of inexpensive cotton goods in the eighteenth century. The process of manufacturing cotton cloth had two steps. First, spinners made cotton thread from raw cotton. Then, weavers wove the cotton thread into cloth on looms. Individuals did these tasks in their rural cottages in the eighteenth century. This production method was called a **cottage industry**.

A number of technological advances happened during this time. These advances included inventions that made cottage industry inefficient. In 1764 James Hargreaves invented a machine called the spinning jenny. The spinning jenny made the spinning process much faster. In fact, spinners produced thread faster than weavers could use it.

Edmund Cartwright invented a water-powered loom in 1787. With this loom, workers could now weave cloth as fast as spinners produced thread. It was now more efficient to bring workers to the new machines and have them work in factories near streams and rivers. The streams and rivers were used to power many of the early machines.

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### Lesson 1 The Industrial Revolution, *continued*

The cotton industry became even more productive when the steam engine was improved in the 1760s by James Watt, a Scottish engineer. In 1782 Watt made changes that allowed the engine to drive machinery. Steam power could now be used to spin and weave cotton. Before long, cotton mills using steam engines could be found throughout Britain. Steam engines were fired by coal instead of powered by water. This meant they did not need to be located near rivers.

British cotton cloth production greatly increased. In 1760, Britain had imported 2.5 million pounds (1.14 million kg) of raw cotton. This was used to produce cloth in cottage industries. By 1840, 366 million pounds (166 million kg) of cotton were imported each year. By this time, cotton cloth was Britain's most valuable product. British cotton goods were produced mainly in factories and sold around the world.

The factory was another important part of the Industrial Revolution. The factory created a new labor system. Factory owners wanted to use their new machines constantly. So, workers were forced to work in shifts to keep the machines producing at a steady rate.

Early factory workers came from rural areas. They were used to periods of very busy work during harvest time, followed by periods of little activity. Early factory owners made workers follow a system of regular hours and repetitive tasks. Adult workers received fines for being late and lost their jobs for more serious misconduct, especially being drunk. Child workers were often beaten with a rod or whipped to keep them at work. One early industrialist said that he wanted to make people like machines that did not make mistakes.

### Coal, Iron, and Railroads

The steam engine was important to Britain's Industrial Revolution. The engine depended on coal for fuel. There seemed to be no limit on the amount of coal available. The success of the steam engine increased the need for coal and led to an expansion in coal production. New processes using coal helped change the iron industry.

Britain's natural resources included large supplies of iron ore. A better quality of iron was produced in the 1780s when Henry Cort developed a process called **puddling**. In this process, coke, which was **derived** from coal, was used to burn away impurities in crude iron. Crude iron is called pig iron. This process allowed an iron of high quality to be made.

The British iron industry increased its production. In 1740 Britain had produced 17,000 tons of iron (15,419 metric tons or t). Production jumped to nearly 70,000 tons (63,490 t) after Cort's process came into use in the 1780s. In 1852 Britain produced almost 3 million tons (2.7 million t). This amount was more iron than was produced by all the rest of the world. High-quality iron was used to build new machines such as trains.

In the eighteenth century, more efficient ways of moving resources and goods developed. Railroads were very important to the success of the Industrial Revolution. Richard Trevithick, an English engineer, built the first steam locomotive. In 1804, Trevithick's locomotive ran on an industrial railway line in Britain. It pulled 10 tons (9 t) of ore and 70 people at 5 miles (8.05 km) per hour. Better locomotives soon followed. One called the Rocket was used on the first public railway line. This railway line opened in 1830 and extended 32 miles (51.5 km) from the cotton-manufacturing town of Manchester to the busy port of Liverpool.

The *Rocket* sped along at 16 miles (25.7 km) per hour while it pulled a 40-ton train. Within 20 years, locomotives were able to reach 50 miles (80.5 km) per hour. This was considered a very fast speed. In 1840 Britain had almost 2,000 miles of railroads. In 1850 more than 6,000 miles (9,654 km) of railroad track crisscrossed much of that country.

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## Industrialization and Nationalism, 1800–1870

### Lesson 1 The Industrial Revolution, *continued*

Building railroads created new jobs for farm laborers and peasants. Less expensive transportation led to lower-priced goods. This created larger markets. More sales meant more factories and more machinery. Business owners could reinvest their profits in new equipment. This added to the growth of the economy. This type of regular, ongoing economic growth became a basic feature of the new industrial economy.



#### Reading Progress Check

**Making Inferences** Why might it be important to have fast, reliable transportation between Manchester and Liverpool?

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## The Spread of Industrialization

**Guiding Question** *What factors fed the spread of industrialization in Europe and North America?*

By the mid-nineteenth century, Great Britain had become the world's first industrial nation. It had also become the world's richest nation. It produced one-half of the world's coal and manufactured goods. Its cotton industry alone in 1850 was equal in size to the industries of all the other European countries together.

The Industrial Revolution spread to the rest of Europe at different times and speeds. France was one of the first states to be industrialized in continental Europe. Industrialization there was a slow process. The French economy was held back by political instability in the late eighteenth and early nineteenth century. France also did not have a good source of coal. Coal was an important resource for industrial development. In contrast to the heavy mechanization in Britain during this period, many goods produced in France were still handmade. Some people also resisted the mechanization of these traditional industries and the government protected them. In the late nineteenth century the French government began to play a major role in the industrialization of France. Roads were improved and the French rail system grew.

The Industrial Revolution in the German states took place in the mid-nineteenth century. The German state of Prussia was especially rich in iron and coal resources. Its government also helped develop iron, steel, and chemical manufacturing companies. The unification of the German state in 1870 led to rapid industrial growth. Unification also made the development of railroad transportation much easier than before. By the early twentieth century, Germany was a great industrial power.

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## Industrialization and Nationalism, 1800–1870

### Lesson 1 The Industrial Revolution, *continued*

An Industrial Revolution also occurred in the United States during the first half of the nineteenth century. In 1800 more than 5 million people lived in the United States. Nearly 6 out of every 7 American workers were farmers. No city had more than 100,000 people. By 1860 the population had grown to more than 30 million people. Many of those people moved into cities. Eight cities had populations over 100,000. Only about 50 percent of American workers were farmers.

The United States was a large country. As a result, it needed a good transportation system to move goods across the nation. Thousands of miles of roads and canals were built to link east and west. Robert Fulton built the first paddle-wheel steamboat, the *Clermont*, in 1807. Steamboats made transportation easier on the waterways of the United States.

The railroad was of major importance in the development of the American transportation system. By 1860, about 30,000 miles (48,270 km) of railroad track covered the United States. The railroad made the country a single huge market for the manufactured goods of the Northeast.

Labor for the growing number of factories in the Northeast came mostly from the farm population. Women and girls made up a large majority of the workers in large textile factories.



#### Reading Progress Check

**Comparing** How did the effects of industrialization in the United States compare with those in Great Britain?

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## Social Impact of Industrialization

**Guiding Question** *What was the social impact of industrialization in Europe?*

The Industrial Revolution greatly changed society in Britain, France, Germany, and other parts of Europe. Cities grew and two new social classes developed in the first half of the 1800s. These new classes were the industrial middle class and the industrial working class.

### Population Growth and Urbanization

The European population was about 140 million in 1750. By 1850, the population had almost doubled to 266 million. The key to this growth was a decline in death rates, in wars, and in major diseases, such as smallpox and plague. People were better fed and better able to fight against disease.

Famine and poverty were two factors in migration and urbanization around the world. Over a million people died during the Irish potato famine. Poverty led a million more to migrate to the Americas. Large numbers of people migrated from the countryside to cities to work in factories.

In 1800 Great Britain had one major city, London, with a population of about 1 million. Six cities had populations between 50,000 and 100,000. By 1850, London's population had grown to about 2.5 million. Nine cities had populations over 100,000. Also, over 50 percent of the population lived in towns and cities.

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## Industrialization and Nationalism, 1800–1870

### Lesson 1 The Industrial Revolution, *continued*

The rapid growth of cities in the first half of the nineteenth century led to terrible living conditions for many. Urban reformers called on local governments to clean up their cities. Reforms would be made in the second half of the nineteenth century.

#### New Social Classes

The Middle Ages saw the rise of commercial capitalism. Commercial capitalism is an economic system based on trade. **Industrial capitalism** is an economic system based on industrial production. This system rose during the Industrial Revolution and produced a new group in the middle class. This group was the industrial middle class.

In the Middle Ages, the bourgeois, or middle-class person, was the burgher or person who lived in town. The bourgeoisie were merchants, government officials, artisans, lawyers, or intellectuals. Later, the term *bourgeoisie* included people involved in industry and banking, as well as lawyers, teachers, and doctors. The new industrial middle class was made up of the people who built the factories, bought the machines, and developed the markets. They had ideas, vision, ambition, and, often, greed. One person said getting money is the main purpose in life.

The Industrial Revolution also created an industrial working class. The working class faced terrible working conditions. Work hours were between 12 and 16 hours a day for 6 days a week. There was no security of employment and no minimum wage.

Working conditions in the coal mines were extremely difficult. Steam-powered engines lifted the coal from the mines to the top, but the men inside the mines dug out the coal. Dangerous conditions, including cave-ins, explosions, and gas fumes, were a way of life. The lack of space in mines and their constant dampness harmed workers' bodies and ruined their lungs.

The worst conditions were in the cotton mills, which were dirty, dusty, dangerous, and unhealthy. In Britain, women and children made up two-thirds of the cotton industry's workforce by 1830. However, the number of child laborers declined after the Factory Act of 1833. This law made 9 the youngest age for employment and limited working hours for older children. Women became 50 percent, or half, of the British labor force in textile factories after child labor was limited. Women were paid half or less than half of the pay that men received. A new pattern of work emerged after the work hours of children and women were limited. Men now earned most of the family income by working outside the home. Women took over daily care of the family and performed low-paying jobs that could be done at home.

#### Early Socialism

The Industrial Revolution created terrible living and working conditions in the first half of the nineteenth century. This led to a movement known as **socialism**. In this economic system, society, usually in the form of the government, owns and controls factories and utilities in this economic system.

Early socialism was mostly the idea of intellectuals. Such ideas were impractical dreams to later socialists, especially the followers of Karl Marx. They called the earlier reformers utopian socialists. The term is still used today. Robert Owen was one utopian socialist. Owen was a British cotton manufacturer. He believed that humans would show their natural goodness if they lived in a cooperative environment. Owen changed the dirty factory town of New Lanark in Scotland into a flourishing community. He created a similar community at New Harmony, Indiana, in the United States in the 1820s, but that community failed.

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The Chancellor of Germany, Otto von Bismarck, responded to the development of the socialist movement in the 1880s. He created old age pensions, accident insurance, medical care, and unemployment insurance. Beginning in the 1890s the government of France slowly began to adopt these same measures. These moves formed the basis of the modern European welfare state.



#### Reading Progress Check

**Drawing Conclusions** Why do you think the working conditions during the Industrial Revolution led some to argue for socialism?

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