The Industrial Revolution

This packet includes:
1. Primary Source Readings
2. Textbook Guided Reading worksheets
3. Academic Skills worksheets
4. Regents DBQ's & M/C questions
5. Summary readings & Vocab
The Beginnings of Industrialization

BEFORE YOU READ
In the last section, you read about romanticism and realism in the arts.
In this section, you will read about the beginning of the Industrial Revolution.

AS YOU READ
Use this chart to take notes on important developments and conditions that led to industrialization.

Industrial Revolution Begins in Britain (pages 283–284)

How did the Industrial Revolution begin?

The Industrial Revolution was the great increase in production that began in England during the 18th century. Before the Industrial Revolution, people made most goods by hand. By the middle of the 1700s, more and more goods were made by machines.

The Industrial Revolution began with an agricultural revolution. In the early 1700s, large landowners in Britain bought much of the land that had been owned by poorer farmers. The landowners collected these lands into large fields closed-in by fences or hedges. These fields were called enclosures. Many of the poor farmers who lost their lands became tenant farmers. Others gave up farming and moved to the cities.

New farm methods made farmers more productive. For example, Jethro Tull invented a seed drill that made planting more efficient. Farmers also practiced crop rotation. Crop rotation is the practice of planting a different crop in a different field each year.

The increase in farm output made more food available. People enjoyed better diets. The population of Britain grew. Fewer farmers were needed to grow food. More people began to make goods.
other than food. The growth in the number of people in cities to work in factories helped create the Industrial Revolution.

For several reasons, Britain was the first country to industrialize. **Industrialization** is the process of developing machine production of goods.

Great Britain had all the resources needed for industrialization. These resources included coal, water, iron ore, rivers, harbors, and banks. Britain also had all the **factors of production** that the Industrial Revolution required. These factors of production included land, labor (workers), and capital (wealth).

1. **Why was Britain the first country to industrialize?**

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**Inventions Spur Industrialization** (pages 284-286)

**What inventions helped change business?**

The Industrial Revolution began in the textile industry. Several new inventions helped businesses make cloth and clothing more quickly. Richard Arkwright invented the water frame in 1769. It used water power to run spinning machines that made yarn. In 1779, Samuel Compton invented the spinning mule that made better thread. In 1787, Edmund Cartwright developed the power loom. The power loom was a machine that sped up the cloth-making process.

These new inventions were large and expensive machines. Business owners built large **factories** to house and run these machines. These factories were built near rivers because these machines needed water-power to run them.

2. **How was the textile industry changed by the new inventions?**

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**Improvements in Transportation:**

**The Railway Age Begins** (pages 287-288)

The invention of the steam engine in 1705 brought in a new source of power. The steam engine used fire to heat water and produce steam. The power of the steam drove the engine. Eventually steam-driven engines were used to run factories.

At the same time, improvements were being made in transportation. Robert Fulton, an American, invented the first steam-driven boat. This invention allowed people to send goods more quickly over rivers and canals.

Starting in the 1820s, steam brought a new burst of industrial growth. George Stephenson, a British engineer, set up the world's first railroad line. It used a steam-driven locomotive. Soon, railroads were being built all over Britain.

The railroad **boom** helped business owners move their goods to market more quickly. It created thousands of new jobs in several different industries. The railroad had a deep effect on British society. For instance, people could now travel throughout the country more quickly.

3. **What effects did the invention of the steam engine have?**
For centuries, human and animal muscle pulled plows and wagons and operated oars. In addition, wind provided the power to run windmills and propel ships. However, these methods put limits on the amount of work that could be done. In 1705, the development of the steam engine broke through these barriers, and in 1765 a Scotsman named James Watt further spurred industrialization by vastly improving the steam engine.

Watt was born in Scotland in 1736. He was a sickly child, and his mother schooled him at home for a few years. However, the largest part of his education was in his father's workshop. He was a shipbuilder who also made devices for navigation. Young James was given his own tools, bench, and forge, and he learned how to build machines by making models of cranes and organs.

At age 18, Watt decided to become a maker of mathematical instruments. After some training, he moved to Glasgow to begin his work. Local guilds—organizations of craft workers—prevented him from starting his own business. Some friends, however, secured him an appointment at the University of Glasgow to practice his craft.

Before Watt was 30 years old, he had developed his first invention. He was asked to fix a steam engine used for demonstrations in a physics class. Steam engines had been in use for many decades in the mining industry, where they pumped water out of deep shafts. The problem was that these machines burned a tremendous amount of fuel to make steam. As Watt repaired the engine, he noticed this inefficiency.

The steam produced by the engine was pushed into a cylinder where the steam then cooled. The problem was that the cylinder had to be heated again because it cooled along with the steam. Watt invented a separate chamber where the steam could be condensed without reducing the temperature of the cylinder. As a result, his improved steam engines used considerably less fuel.

Watt then became partners with a business owner so he could manufacture his machine. Watt also filed a patent to own the rights to his creation. Others could use it, but they had to pay a fee to Watt. In a few years his first partner was replaced by another, Matthew Boulton. Watt and Boulton worked together for several decades. They were a good team, with Watt providing the engineering knowledge and Boulton the business sense.

Watt continued to find new ways to make the steam engine work better. Then Boulton convinced Watt to devise one major improvement. Boulton believed that the steam engine could be used in mills that made flour and textiles. To be useful, though, the engine would have to drive machines that moved in a circle, not up and down like a pump. By 1781, Watt had built a motor that rotated a shaft that came out of the machine. As Boulton had predicted, the new invention caught on quickly. By 1800, his and Watt's company had sold about 500 steam engines in Great Britain, and most were the new rotating type.

Watt was also interested in chemistry and won credit for an important discovery. He was the first to suggest that water was not a basic element but a compound made of different chemicals. However, he was never able to identify what was involved in making water.

Watt was responsible for other inventions and held many different patents. They earned him around 76,000 British pounds in just over a decade. In 1800, when the patents expired, he and Boulton gave their business to their sons and retired. Watt lived 19 more years, spending the time traveling and receiving honors for his work. However, his interest in machines did not end. He had a workshop made in the attic of his house, where he continued to tinker.

Questions
1. **Drawing Conclusions** Why was the steam engine an improvement in powering work?
2. **Determining Main Ideas** What is a patent? Does the right it grants last forever?
3. **Making Inferences** How did Watt's and Boulton's different abilities strengthen their partnership?
**Impact of the Steam Engine on the Industrial Revolution in Great Britain**

Directions:
Mine the diagrams below & review the statements that follow. For each statement decide if it is accurate (A), inaccurate (I), or cannot be either based on the information presented (C).

1. These graphs are about the 19th Century
2. The graphs are about Western Europe
3. In 1845, Great Britain consumed 600 million pounds of raw cotton
4. In all three graphs, the growth leveled off by 1855
5. There is a direct link between the data presented and Watt’s Steam Engine
6. Data presented contains examples of modernization of the economy
"Why Great Britain?"

What were the reasons the Industrial Revolution began in GB?

...England, however, has grown great in both respects. She is both a great colonial power and a great industrial power. And she has been fortunate in possessing the natural conditions necessary to success.

For industry and commerce, no less than the command of the seas, are limited by natural conditions. Modern manufactures cluster round coal-fields, where power can be had cheaply; the possession of good harbours is essential to maritime trade; a country where broad and gently-flowing rivers act as natural canals will have advantages in internal communications over a country broken up by mountain ranges. . . . When we recognize that England is rich in these advantages, that she has coal and iron lying close together, that her sheep give the best wool, that her harbours are plentiful, that she is not ill-off for rivers, and that no part of the country is farther than some seventy miles from the sea, we have not said all. . . .

Source: George T. Warner, Landmarks in English Industrial History, Blackie & Son Limited

Directions:
Use the documents above and to the right to evaluate the accuracy of the statement below. Circle the letter you believe conveys correct answer

Key:
A = Statement is Accurate
IN = Statement is Inaccurate
C = Accuracy of statement cannot be determined from information available

Invention | Description
---|---
Improved steam engine (James Watt) | Improved version of steam engine that used coal rather than water power. First used to pump water from mines and to forge iron. By the late 1780s, powered machines in cotton mills.

Source: Ellis and Esler, World History: Connections to Today, Prentice Hall, 1999 (adapted)

Statements:

According to G.T. Warner,
1. England was a great colonial and industrial power (A / IN / C)
2. Modern manufacturers cluster around harbors (A / IN / C)
3. The geography of Great Britain played a significant role in her industrialization (A / IN / C)

James Watt invented a machine that
1. modernized society (A / IN / C)
2. improved the efficiency of production (A / IN / C)
**Industrialization Case Study: Manchester**

**BEFORE YOU READ**
In the last section, you saw how the Industrial Revolution began.
In this section, you will read about some of its effects.

**AS YOU READ**
Use the chart below to record the effects of industrialization.

**Negative effects**
- Crowded cities

**Positive effects**

**Terms and Names**
- Urbanization: City building and the movement of people to cities
- Middle class: A social class of skilled workers, professionals, business people, and wealthy farmers

**Industrialization Changes Life**
(pages 289–291)

**How did industrialization change people’s ways of life?**

Industrialization brought many changes to the British people. More people could use coal to heat their homes, eat better food, and wear better clothing.

Another change was urbanization—city building and the movement of people to cities. For centuries, most people in Europe had lived in the country. By the 1800s, more and more people lived in cities, where they had come to find jobs.

Living conditions were bad in crowded cities. Many people could not find good housing, schools, or police protection. Filth, garbage, and sickness were part of life in the slums. A person in a city could expect to live 17 years. In the countryside, a person could expect to live 38 years.

Working conditions were also bad. The average worker spent 14 hours a day on the job, 6 days a week. Many workers were killed or seriously injured in accidents.

1. What were major changes in living conditions and working conditions?
Class Tensions Grow;
Positive Effects of the
Industrial Revolution (pages 291–292)

Who were the members of the middle class?

Some people's lives were improved in the new economy. The Industrial Revolution created new wealth for the middle class, which included skilled workers, professionals, business people, and wealthy farmers. People in the middle class enjoyed comfortable lives in pleasant homes. This class began to grow in size. Some people grew wealthier than the nobles who had been in control for many centuries.

The Industrial Revolution had many good effects. It created wealth. It created jobs for workers and over time helped many of them live better lives. It produced better diets, better housing, and better clothing at lower prices.

2. What were three positive effects of industrialization?

The Mills of Manchester (pages 292–294)

What changes occurred in Manchester?

The English city of Manchester is a good example of how industrialization changed society. Rapid growth made the city crowded and filthy. The factory owners risked their money and worked long hours to make their businesses grow. In return, they enjoyed huge profits and built huge houses. The workers also worked long hours, but had few benefits. Many of these workers were children, some only six years old. The British government did not limit the use of children as workers until 1819.

The large amount of industry in Manchester caused environmental problems. Coal smoke and cloth dyes from the factories polluted the air and water. Yet, Manchester also created many jobs, a variety of consumer goods, and great wealth.

3. Why is Manchester a good example of how industrialization changed cities?

Skillbuilder

Use the graph to answer these questions.

1. How many years does this data cover?

2. What was the rate of growth in Birmingham from 1700 to 1900?
**Industrialization - The Effects**

<table>
<thead>
<tr>
<th>Patterns of Change: Industrialization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size of Cities</strong></td>
</tr>
<tr>
<td>• Growth of factories, bringing job seekers to cities</td>
</tr>
<tr>
<td>• Urban areas doubling, tripling, or quadrupling in size</td>
</tr>
<tr>
<td>• Factories developing near sources of energy</td>
</tr>
<tr>
<td>• Many new industrial cities specializing in certain industries</td>
</tr>
<tr>
<td><strong>Living Conditions</strong></td>
</tr>
<tr>
<td>• No sanitary codes or building controls</td>
</tr>
<tr>
<td>• Lack of adequate housing, education, and police protection</td>
</tr>
<tr>
<td>• Lack of running water and indoor plumbing</td>
</tr>
<tr>
<td>• Frequent epidemics sweeping through slums</td>
</tr>
<tr>
<td>• Eventually, better housing, healthier diets, and cheaper clothing</td>
</tr>
<tr>
<td><strong>Working Conditions</strong></td>
</tr>
<tr>
<td>• Industrialization creating new jobs for workers</td>
</tr>
<tr>
<td>• Workers trying to keep pace with machines</td>
</tr>
<tr>
<td>• Factories dirty and unsanitary</td>
</tr>
<tr>
<td>• Workers running dangerous machines for long hours in unsafe conditions</td>
</tr>
<tr>
<td>• Harsh and severe factory discipline</td>
</tr>
<tr>
<td>• Eventually, higher wages, shorter hours, and better working conditions</td>
</tr>
<tr>
<td><strong>Emerging Social Classes</strong></td>
</tr>
<tr>
<td>• Growing middle class of factory owners, shippers, and merchants</td>
</tr>
<tr>
<td>• Upper class of landowners and aristocrats resentful of rich middle class</td>
</tr>
<tr>
<td>• Lower middle class of factory overseers and skilled workers</td>
</tr>
<tr>
<td>• Workers overworked and underpaid</td>
</tr>
<tr>
<td>• In general, a rising standard of living, with some groups excluded</td>
</tr>
</tbody>
</table>

**SKILLBUILDER: Interpreting Charts**

1. Which social class benefited most and which suffered most from industrialization?
2. What were some of the advantages and disadvantages of industrialization?

**Directions:** Review the chart above & complete the following tasks

1. Identify the 8 most important effects from those listed in the document above (you should try to include at least two from each category)

2. Categorize your chosen effects & group them into positive & negative effects. Copy the chart below into your notebook and add your chosen effects

<table>
<thead>
<tr>
<th>Positive Effects</th>
<th>Negative Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
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<tr>
<td>2.</td>
<td>2.</td>
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<tr>
<td>3.</td>
<td>3.</td>
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<tr>
<td>4.</td>
<td>4.</td>
</tr>
</tbody>
</table>
A Woman Coal Mine Worker Tells Her Story

The working conditions in industries and mines during the Industrial Revolution provoked numerous investigations by lawmakers and others interested in protecting the health and morals of workers. In Great Britain, a parliamentary investigation of the coal industry in 1842 produced the document from which the following woman mine worker's story is taken.

Betty Harris, age 37: I was married at 23, and went into a colliery [mine] when I was married. I used to weave when about 12 years old; can neither read nor write. I work for Andrew Knowles, of Little Bolton [Lancashire], and make sometimes 7 [shillings] a week, sometimes not so much. I am a drawer [someone who pulls coal carts], and work from 6 in the morning to 6 at night. Stop about an hour at noon to eat my dinner; have bread and butter for dinner; I get no drink. I have two children, but they are too young to work. I worked at drawing when I was in the family way [pregnant]. I know a woman who has gone home and washed herself, taken to her bed, delivered of a child, and gone to work again under the week.

I have a belt round my waist, and a chain passing between my legs, and I go on my hands and feet. The road is very steep, and we have to hold by a rope; and when there is no rope, by anything we can catch hold of. There are six women and about six boys and girls in the pit I work in; it is very hard work for a woman. The pit is very wet where I work, and the water comes over our clog-tops always, and I have seen it up to my thighs; it rains in at the roof terribly. My clothes are wet through almost all day long. I never was ill in my life, but when I was [recovering from giving birth].

My cousin looks after my children in the day time. I am very tired when I get home at night; I fall asleep sometimes before I get washed. I am not so strong as I was, and cannot stand my work so well as I used to. I have drawn till I have bate [scraped] skin off me; the belt and chain is worse when we are in the family way. My feller

[husband] has beaten me many a times for not being ready. I were not used to it at first, and he had little patience.

I have known many a man beat his drawer. I have known men take liberties with the drawers. . . .

Review Questions

1. What type of work did Betty Harris do in the coal mines?
2. How were women coal mine workers treated?
3. What effect do you think the government report had on conditions in the mines?
CHAPTER 25 Section 4 (pages 734–741)

Reforming the Industrial World

BEFORE YOU READ
In the last section, you saw how industrialization spread to different nations.
In this section, you will learn about new ideas and reforms.

AS YOU READ
Fill in the web below with the major ideas and changes you read about.

The Philosophers of Industrialization (pages 734–735)

What is capitalism?
Industrialization led to new ways of thinking about society. Some economists thought that the government should leave business owners alone. Their view is called laissez faire.

Adam Smith argued that governments should not put limits on business. He believed this freedom would help a nation's economy grow. He and others, including British economists Thomas Malthus and David Ricardo, supported a system called capitalism. In a capitalist economy, people invest their money in businesses to make a profit. Smith and the others believed that society would benefit over time from this system. Supporters of laissez faire opposed laws to protect workers.

1. How does capitalism work?

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TERMS AND NAMES
laissez faire Economic theory that argues that governments should not interfere with business affairs
Adam Smith Philosopher who defended laissez faire economics
capitalism Economic system in which people invest money to make a profit
utilitarianism Belief that an idea is only as good as it is useful
socialism Belief that businesses should be owned by society as a whole
Karl Marx Economic thinker who wrote about a radical form of socialism
communism Form of socialism in which all production is owned by the people
union Organized groups of workers that bargain with business owners to get better pay and working conditions
strike Organized refusal to work
Rise of Socialism; Marxism; Radical Socialism (pages 735–738)

What is socialism?

Other thinkers challenged capitalist ideas. One group was called the utilitarians. According to utilitarianism, an idea or practice is good only if it is useful. The utilitarians thought it was unfair that workers should work so hard for such little pay and live in such poor conditions. They thought the government should work to end great differences in wealth among people.

Some thinkers wanted society as a whole to own businesses. This way a few people would not grow wealthy at the expense of everyone else. Instead, all people would enjoy the benefits of increased production. This view—called socialism—grew out of a belief in progress and a concern for justice and fairness.

A German thinker named Karl Marx proposed a form of socialism that became known as Marxism. He said that factory owners and workers would struggle for power. Over time, he said, the capitalist system would destroy itself. The great mass of workers would rebel against the wealthy few.

Marx wrote The Communist Manifesto. It described communism, a form of socialism in which production is controlled by the people. In the early 1900s, these ideas would bring revolution.

2. How are capitalism and socialism different?

Labor Unions and Reform Laws (pages 738–739)

How did workers take action to improve their lives?

While thinkers discussed these different ideas, workers fought to improve their lives. Many workers joined unions. A union is a group of workers that tries to bargain with employers for better pay and better working conditions.

When employers resisted these efforts, the workers went on strike, or refused to work. British and American workers struggled for a long time to win the right to form unions. By the late 1800s, workers in both countries had made some progress.

The British parliament and reformers in the United States also tried to fix other social problems. Britain passed laws to limit how much work women and children could do. Groups in the United States pushed for similar laws.

3. How did both the government and workers themselves try to improve workers’ lives?

The Reform Movement Spreads (pages 739–740)

What other reforms were taking place at this time?

Another major reform movement of the 1800s was the effort to abolish slavery. The British parliament ended the slave trade in 1807. It then abolished slavery throughout British territories in 1833.

Slavery was finally abolished in the United States in 1865, after the Civil War. Spain ended slavery in Puerto Rico in 1873 and in Cuba in 1886. In 1888 Brazil became the last country to ban slavery.

Women were active in many reform movements. As they fought for the end of slavery, many women began to fight for equal rights for women. The movement for equality began in the United States in 1848. In 1888, women from around the world formed a group dedicated to this cause.

Reformers took on other projects as well. Some pushed for—and won—improved education. Others tried to improve conditions in prisons.

4. Name two major reform movements of the 1800s.
Directions:
Use the statements below to determine the accuracy of the statements at the bottom of the page. Indicate the accuracy by labeling each statement with an A if accurate, an I if inaccurate or a C if their accuracy cannot be determined.

Speaker A: "Human labor is nothing more than a commodity, which is offered for sale in the marketplace. It is governed by the laws of supply and demand. If wages are increased for one generation when the supply of workers is low, people will have more children and there will be an oversupply in the next. To prevent this, wages should not be increased in the first place."

Speaker B: "Government must end its ideas of mercantilism. Prices should be determined by the laws of supply and demand, not by government regulation. Free trade and competition are necessary to encourage the production of goods that are of good quality and low price."

Speaker C: "The capitalist class will never give up the ownership of the means of production peacefully. Workers should band together and overthrow the owners and secure for themselves the right to ownership. Inevitably, the workers will win."

Speaker D: "Economic equality can be achieved by everyone cooperating in communities established to relieve the horrible conditions in the factories. Human nature can be adapted so that people can live in harmony."

Speaker A supports the ideas of Karl Marx - A I C
Speaker C supports the ideas of Laissez-Faire economics - A I C
Speaker D supports the Theory of Divine Right - A I C
Speaker E supports the ideas of Friedrich Engels - A I C
Speaker B supports the ideas of mercantilism - A I C
The Effect of the Enlightenment on Industrial Britain

Directions: Review the Documents below and answer the accompanying questions into your notebook.

Doc 1:

GRAPHIC SUMMARY: Social Reform in Great Britain, 1815–1914

Social Reform

Crime and Punishment
- Fewer crimes punished by death
- End to public hangings
- Improved prison conditions

Education
- Free elementary school for all children
- State-aided secondary schools
- Some public universities

Rights of Workers
- Trade unions legalized
- Limits on child labor and work hours
- Improved safety
- Minimum wages
- Accident and unemployment insurance
- Inspectors enforce laws

Between 1815 and 1914, Britain passed laws to abolish slavery, improve working conditions, and extend voting rights.

Q1. What areas of society saw improvements because of reform effort between 1815 & 1914?
Q2. Identify 3 new freedoms (use specific examples) gained through these reform efforts
Q3. What ideas of the Enlightenment are reflected in the changes achieved in this doc?

Doc 2:

Great Britain

1928 • All women can vote
1918 • Women over 30 can vote
1911 • New limits on the power of House of Lords
1880s • Fair division of seats in Parliament
1880s • End of Slavery in Britain and British colonies
1880s • End of bans on voting rights for certain religious groups
1867 • Most men have the vote
1867 • Elections now held by secret ballot
1850s • Most male property owners can vote
1850s • Fair division of seats in Parliament
1850s • End of Slavery in Britain and British colonies
1820s • End of bans on voting rights for certain religious groups
1815 • Fewer than five percent of population has right to vote
1815 • Politics controlled by wealthy men
1815 • Some religions banned from voting

Between 1815 and 1914, Britain gained democracy through reform rather than revolution.

Document 1:

Q1. What areas of society saw improvements because of reform effort between 1815 & 1914?
Q2. Identify 3 new freedoms (use specific examples) gained through these reform efforts
Q3. What ideas of the Enlightenment are reflected in the changes achieved in this doc?

Document 2:

Q4. What new rights does Doc 2 indicate were given to men & women?
Q5. What ideas of the Enlightenment are reflected in the changes achieved in this doc?
Q6. What does document 2 mean by the statement at the bottom of the Document?
Artistic Reactions to the changes of the Industrial Revolution

1. **Romanticism** (c. 1750 – 1850)
   a. Appeal to emotion rather than reason (revolt against reason)
   b. Artists aimed to capture beauty/force of nature
   c. Musicians used crescendos (swelling of notes) to stir feelings
      i. Beethoven’s 9th symphony - “Ode to Joy”

   Example: __________________________________________
   Why?: __________________________________________

2. **Realism** (c. mid-1800’s)
   a. Attempted to depict the world as it was
   b. Emphasized harshness of new industrial society
   c. Saw themselves as social commentators trying to bring about change

   Example: __________________________________________
   Why?: __________________________________________

3. **Impressionism** (c. 1870’s)
   a. Reaction to realism and emergence of photography
   b. Artists sought to capture the fleeting impression of a first glance of a scene/object

   Example: __________________________________________
   Why?: __________________________________________
Inventors Make Life Easier
(pages 762–764)

**How did inventions change ways of life?**

In the late 1800s, new inventions changed how people lived. Inventors around the world worked to make new machines. Thomas Edison received patents on more than 1,000 inventions. Among them were the electric light bulb and phonograph. Alexander Graham Bell invented the telephone. Guglielmo Marconi created the first radio.

There were changes in transportation, too. Henry Ford made the car affordable to ordinary people. He had a factory with an **assembly line**. It allowed him to build cheap cars. These cars were affordable for ordinary people. In 1903, the Wright brothers flew the first motor-powered airplane flight. Soon there was an aircraft industry.

1. **What were three important inventions during this period?**
New Ideas in Medicine (page 764)

**What new ideas appeared in medicine?**

Until the mid-1800s, no one knew about germs. French scientist Louis Pasteur discovered that microscopic animals could live in food. Pasteur called these tiny creatures *bacteria*. Scientists such as Joseph Lister soon realized that bacteria could cause disease.

2. What relevance did Pasteur’s ideas have to the treatment of disease?

New Ideas in Science (pages 765–766)

**What new ideas appeared in science?**

English scientist Charles Darwin developed the *theory of evolution*. This theory said that all life on earth had developed from simpler life forms over millions of years. This theory was hotly debated. Many people did not accept this idea. They said it went against the bible.

In the mid-1880s, an Austrian monk named Gregor Mendel showed that parents passed on their personal traits to their offspring. The science of genetics began.

Other scientists made new discoveries in chemistry and physics. They found that all matter is made of tiny particles called atoms. Marie and Pierre Curie discovered *radioactivity*. Radioactivity is the energy that is released when atoms decay.

3. Tell what each of the following discovered or developed: Charles Darwin, Gregor Mendel, Marie and Pierre Curie.

Social Sciences Explore Behavior (page 766)

**What is psychology?**

In the late 1800s, some thinkers began to study the human mind. This new social science was called psychology. The Russian scientist Ivan Pavlov conducted a series of experiments. These experiments convinced him that people responded to certain situations because of how they were trained.

Sigmund Freud, an Austrian doctor, argued that a person’s actions are shaped by forces in the subconscious mind. These views shocked many. They seemed to overturn the idea that people could use their reason to build better lives.

4. What did Freud reveal about the mind?

The Rise of Mass Culture (pages 766–767)

**What is mass culture?**

In earlier times, most art, music, and the theater had been of interest to only the wealthy. With the rise of the middle class, a new mass culture developed.

This new mass culture appealed to a wide audience. People went to music halls to enjoy singing and dancing. In the early 1900s, they watched the first silent movies. People also enjoyed sporting events, both as participants and as spectators.

5. What new forms of entertainment became popular?
Glossary

abolish  To end
agricultural revolution  Changes that led to great increases in the amount of food farmers produced
ban  To forbid
boom  A time of increased activity, wealth, and prosperity
economists  People who study the ways that goods are made, sold, and bought
imperialism  Actions or policies by which one country controls another
Marxism  Form of socialism proposed by Karl Marx
output  Amount of something produced or manufactured
raw materials  Materials used in factories to create goods
resisted  Worked against
slums  Areas of poverty and poor housing
stock  Shares of ownership in a company
tenant farmers  Farmers who work land rented from someone else
textile  Related to cloth or clothing

AFTER YOU READ

Terms and Names

A. Write the term or name in each blank that best completes the meaning of the paragraph.

Karl Marx  A great economic thinker who believed in free markets was 1 __________. He also supported a policy of leaving businesses alone to run the economy. This philosophy is called 2 __________. Ideas like this are part of a larger economic system called 3 __________.

Adam Smith  Another great economic and social thinker was 4 __________. He described an economic and government system called communism. This system is a form of 5 __________.

B. Write the letter of the name or term next to the description that explains it best.

a. industrialization  ____ 1. Process of developing machine production of goods
b. urbanization  ____ 2. Belief that an idea or thing is only as good as it is useful
c. corporation  ____ 3. Resources needed to produce goods and services
d. utilitarianism  ____ 4. Business owned by stockholders
e. factors of production  ____ 5. City building and movement of people to cities

CHAPTER 25  THE INDUSTRIAL REVOLUTION 245
Main Ideas

1. What was the agricultural revolution, and what caused it?

2. What inventions played a key role in the early development of the Industrial Revolution?

3. How did the Industrial Revolution change cities?

4. Name two countries in which industrialization got an early start. Explain why.

5. What were three of the most important social reforms that followed the Industrial Revolution?

Thinking Critically

Answer the following questions on a separate sheet of paper.

1. Discuss the major negative effects of industrialization on society.

2. How did the Industrial Revolution affect economic thought?
CHAPTERS IN BRIEF  The Industrial Revolution, 1700–1900

CHAPTER OVERVIEW Britain fueled an Industrial Revolution, which changed society. Workers benefited eventually, but at first they suffered bad working and living conditions. Other nations followed Britain’s example and industrialized. Thinkers reacted to these changes by developing new views of society. Reformers pushed for changes to make society better.

The Beginnings of Industrialization

KEY IDEA The Industrial Revolution started in Great Britain and soon spread elsewhere.

In the early 1700s, large landowners in Britain bought much of the land that had been owned by poorer farmers. They introduced new ways of farming. One technique was to use a seed drill. This machine planted seeds in well-spaced rows. Before this, seeds were scattered by hand over the ground. As a result, more seeds sprouted. Another technique was to rotate crops annually. Those who raised livestock used new methods to increase the size of their animals. As a result of these improvements, farm output increased. More food was available, and people enjoyed healthier diets. The population of Britain grew. The agricultural revolution helped produce the Industrial Revolution.

The Industrial Revolution refers to the greatly increased output of machine-made goods that began in Great Britain in the mid–1700s.

For several reasons, Britain was the first country to have an economy based on industry. It had 1) coal and water to power machines, 2) iron ore to make machines and tools, 3) rivers to move people and goods, and 4) good harbors for shipping goods to other lands. Britain also had a system of banks that could fund new businesses. Finally, the British government was stable, which gave the country a positive attitude.

The Industrial Revolution began in the textile industry. Several new inventions helped businesses produce cloth and clothing more quickly. Business owners built huge buildings—factories—that housed large machines powered by water.

The invention of the steam engine in 1705 brought in a new source of power. The steam engine used fire to heat water and produce steam, which was used to drive the engine. Eventually steam-driven machines were used to run factories.

At the same time, improvements were being made in transportation. An American invented the first steam-driven boat. This allowed people to send goods more quickly over rivers and canals. The British also built better roads that included layers of stone and rock to prevent wagons from being stuck in the mud.

Starting in the 1820s, steam fueled a new burst of industrial growth. At that time, a British engineer set up the world’s first railroad line. It used a steam-driven locomotive. Soon, railroads were being built all over Britain. The railroad boom helped business owners move their goods to market more quickly. The boom in railroad building created thousands of new jobs in several different industries. The railroad had a deep effect on British society. For instance, people who lived in the country moved to cities.

Industrialization Case Study: Manchester

KEY IDEA The factory system changed the way people lived and worked, bringing both benefits and problems.

The change to an industrial economy brought many benefits to British people. They used coal to heat their homes, ate better food, and wore better clothing. Many people also suffered, however. Industrialization caused many changes.

One change was a rise in the proportion of people who lived in cities. For centuries, most people in Europe had lived in the country. Now more and more lived in cities. The number of cities with more than 100,000 people doubled between 1800 and 1850. Because they grew quickly, cities were not ideal places to live. People could not find good housing, schools, or police protection. The cities were filthy with garbage, and sickness swept through slum areas. The average life span of a person living in a city was 17 years—compared to 38 years in the countryside.
Working conditions were harsh as well. The average worker spent 14 hours a day on the job, 6 days a week. Factories were dark, and the powerful machines were dangerous. Many workers were killed or seriously injured in accidents. Some rioted against the poor living and working conditions. Some people improved their lives in the new economy. The middle class—made up of skilled workers, professionals, business people, and wealthy farmers—did well. They enjoyed comfortable lives in pleasant homes. This class began to grow in size, and some people in it grew wealthier than the nobles who had dominated society for many centuries. Still, nobles looked down on the people who gained their wealth from business. They, in turn, looked down on the poor workers.

Overall, the Industrial Revolution had many good effects. It increased the amount of goods and services a nation could produce and added to its wealth. It created jobs for workers and over time helped them live better lives. It produced better diets, better housing, and cheaper, better clothing. Many of these benefits were far in the future, however.

The English city of Manchester showed how industrialization changed society. Rapid growth made the city crowded and filthy. The factory owners risked their money and worked long hours to make their businesses grow. In return, they enjoyed huge profits and built huge houses. The workers also worked long hours, but had few benefits.

Many workers were children, some only six years old. Not until 1819 did the British government put limits on using children as workers. With so much industry in one place, Manchester suffered in another way. Coal smoke and cloth dyes polluted the air and water. Yet, Manchester also created many jobs, a variety of consumer goods, and great wealth.

**Industrialization Spreads**

**KEY IDEA** The industrialization that began in Great Britain spread to other parts of the world.

Other countries followed the example of Britain and began to change their economies to an industrial base. The United States was one of the first. Like Britain, it had water power, sources of coal and iron, and a ready supply of workers. The United States also benefited from conflict with Britain. During the War of 1812, Britain stopped shipping goods to the United States. As a result, American industries had a chance to supply the goods that Americans wanted.

The switch to an industrial economy began in the United States in the textile industry. In 1789, based on memory and a partial design, a British worker brought the secret of Britain's textile machines to North America. He built a machine to spin thread. In 1813, a group of Massachusetts investors built a complex of factories that made cloth. Just a few years later they built an even larger complex in the town of Lowell. Thousands of workers, mostly young girls, came to these towns to work in the factories.

In the United States, industry grew first in the Northeast. In the last decades of the 1800s, a rapid burst of industrial growth took place that was more widespread. This boom was fueled by large supplies of coal, oil, and iron. Helping, too, was the appearance of a number of new inventions, including the electric light. As in Britain, railroad building was also a big part of this industrial growth.

Businesses needed huge sums of money to take on big projects. To raise money, companies sold shares of ownership, called stock. All those who held stock were part owners of the company. This form of organizing a business is called a corporation.

Industrial growth spread to Europe as well. Belgium was the first to adopt British ways. It was rich in iron and coal and had good waterways. It had the resources needed.

Germany was politically divided until the late 1800s. As a result, it could not develop a wide industrial economy. However, west-central Germany was rich in coal and did become a leading industrial site.

Across Europe, small areas began to change to the new industries. Industrial growth did not occur in France until after 1830. It was helped by the government’s construction of a large network of railroads. Some countries—such as Austria-Hungary and Spain—had problems that stopped them from building new industries.

The Industrial Revolution changed the world. Countries that had adopted an industrial economy enjoyed more wealth and power than those that had not. The countries of Europe soon began to take advantage of lands in Africa and Asia. They used these lands as sources of raw materials needed for their factories. They saw the people only as markets for the goods they made. They took control of these lands, a practice called imperialism.

The Industrial Revolution changed life forever in the countries that industrialized. Problems
caused by industrialization led to movements for social reform.

**Reforming the Industrial World**

**KEY IDEA** The Industrial Revolution led to economic, social, and political reforms.

The new industrial economy led to new ways of thinking about society. Some economists thought that the government should leave business owners alone. Their view was called laissez-faire, from a French phrase meaning "let people do as they please." Adam Smith argued that putting no limits on business or on trade would help a nation's economy grow the most. He and other economists supported a system called capitalism. In a capitalist economy, people invest their money in businesses to make a profit. Over time, society as a whole would benefit, said Smith and the others. These people warned the government not to make laws trying to protect workers. Such laws would upset the workings of the economy, they said.

Other thinkers challenged these ideas. One group was called the Utilitarians. They thought that an idea or practice was good only as it proved useful. They thought it was unfair that workers should work so hard for such little pay and live in such poor conditions. They thought the government should do away with great differences in wealth among people.

Some thinkers went farther and urged that businesses should be owned by society as a whole, not by individuals. Then a few people would not grow wealthy at the expense of many. Instead, all would enjoy the benefits of increased production. This view—called socialism—grew out of a belief in progress and a concern for justice and fairness.

A German thinker named Karl Marx wrote about a radical form of socialism called Marxism. He said that factory owners and workers were bound to oppose one another in the struggle for power. Over time, he said, the capitalist system would destroy itself. The great mass of workers would rebel against the wealthy few. Marx wrote *The Communist Manifesto* in which he described communism, a form of complete socialism in which all production is owned by the people. Private property would not exist. In the early 1900s, these ideas would inspire revolution.

While thinkers discussed these different ideas, workers took action to try to improve their lives. Many formed into unions that tried to bargain with business owners for better pay and better working conditions. When business owners resisted these efforts, the workers went on strike, or refused to work. The struggle to win the right to form unions was long and hard for workers in Britain and the United States. Still, by the late 1800s, workers in both countries had made some progress.

The British Parliament and reformers in the United States also took steps to try to fix some of the worst features of industrialism. Britain passed laws that put limits on how much women and children could work. Groups in the United States pushed for similar laws.

Another major reform movement of the 1800s was the drive to abolish slavery. The British Parliament took the first step by ending the slave trade in 1807. It abolished slavery completely in 1833. Slavery was finally ended in the United States in 1865, after the Civil War. Spain ended slavery in Puerto Rico in 1873 and in Cuba in 1886. Brazil became the last country to ban slavery, which it did in 1888.

Women were active in these and other reform movements. As they fought for the end of slavery, many women launched an effort to win equal rights for women. The movement for equality began in the United States in 1848. In 1888, women from around the world formed a group dedicated to this cause.

Reformers took on other projects as well. Some pushed for—and won—improved education. Others hoped to improve conditions in prisons.

**Review**

1. **Analyzing Causes and Recognizing Effects** Why did the Industrial Revolution begin in Britain?
2. **Determining Main Ideas** What was the impact of the railroad?
3. **What reforms were popular in the 1800s?**
4. **Analyzing Causes and Recognizing Effects** What effects did industrialization have on society?
5. **Developing Historical Perspective** How did industrialization spread in the United States?
The Industrial Revolution

**Economic Effects**
- New inventions and development of factories
- Rapidly growing industry in the 1800s
- Increased production and higher demand for raw materials
- Growth of worldwide trade
- Population explosion and expanding labor force
- Exploitation of mineral resources
- Highly developed banking and investment system
- Advances in transportation, agriculture, and communication

**Social Effects**
- Increase in population of cities
- Lack of city planning
- Loss of family stability
- Expansion of middle class
- Harsh conditions for laborers, including children
- Workers’ progress versus laissez-faire economic attitudes
- Improved standard of living
- Creation of new jobs
- Encouragement of technological progress

**Political Effects**
- Child labor laws to end abuses
- Reformers urging equal distribution of wealth
- Trade unions formed
- Social reform movements, such as utilitarianism, utopianism, socialism, and Marxism
- Reform bills in Parliament and Congress