Chapter Summary

Section 1: The Dawn of the Industrial Age

The textile industry began the industrial age. Changes in farming led to greater production of food but eliminated farming jobs, sending workers to seek jobs in towns and cities. New machines increased production greatly.

Section 2: Britain Leads the Way

The Industrial Revolution began in Britain. Capital from trade could be invested in new enterprises. Canals, and later railroads, provided transportation. Britain had ample natural resources and an available labor force.

<u>Chapter Summary</u> (continued)

Section 3: Social Impact of the Industrial Revolution

The early industrial age brought great changes for workers. They lived in crowded tenements and worked in factories and mines. Children and women worked long hours.

Section 4: New Ways of Thinking

Thomas Malthus and others believed in laissez-faire economics. Malthus saw poverty as a result of overpopulation. Later socialists, including Karl Marx, challenged this philosophy, calling for community ownership of the means of production.

Channel Awesome

The Industrial Revolution Begins: Interview

Chapter Review

The Industrial Revolution Begins (1750–1850)

QuickTake Test   **Know It, Show It Test**

Objectives

- 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.

Terms and People

- **anesthetic** – a drug that prevents pain during surgery

- **enclosure** – the process of taking over and consolidating land formerly shared by peasant farmers

- **James Watt** – Scottish engineer who improved the efficiency of the steam engine, making it the key source of power for the Industrial Revolution

- **smelt** – to separate iron from its ore

What events helped bring about the Industrial Revolution?

For thousands of years following the rise of civilization, most people lived and worked in small farming villages. However, a chain of events in the mid-1700s changed that way of life.

Today, we call this period of change the Industrial Revolution.

The Industrial Revolution began in Britain and spread around the world.

- The changes it brought affected peoples lives as much as any political revolution. But unlike a political revolution, it happened gradually.

- The Industrial Revolution was the process by which production shifted from simple hand tools to complex machinery.

The Industrial Revolution influenced people's daily lives.

Life before 1750

- People live in rural villages and work with their hands.

- They grow their food or trade goods in the local market.

- Travel is by foot, horse, or sail.
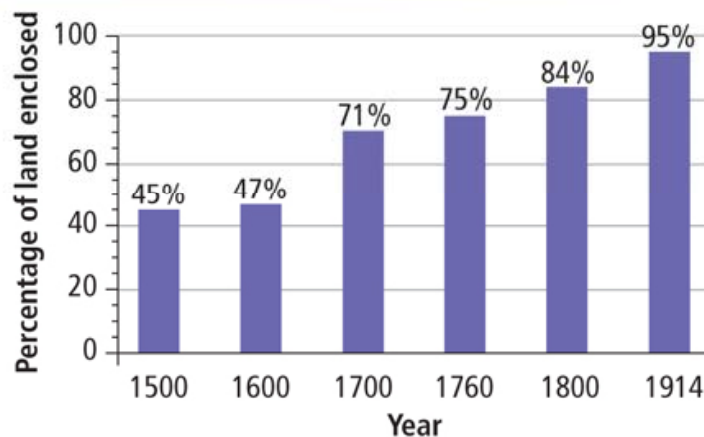
Life after 1850

- People live and work in industrial towns or cities.

- They buy food and clothing made elsewhere.

- They can travel by train or steamboat.

These changes started in the farm fields of Europe.

The Dutch	The British
• The Dutch built dikes and combined small fields to better use land. • They also experimented with fertilizer from livestock.	• The British expanded on Dutch experiments. • They experimented with crop rotation and mixing different soils. • Jethro Tull invented a seed drill that planted seeds in rows rather than scattering them.

Enclosure improved output but displaced peasant farmers.

Land Enclosures in England, 1500–1914

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

SOURCE: *Oxford Atlas of World History,* 1999

- With the help of legislation from Parliament, large landowners consolidated their holdings.

- Larger farms were more efficient, producing more food with less labor and cost.

But land enclosure threw many poor farm workers off the land.

Small landholders couldn't compete,
and unemployed farm laborers migrated to the growing cities for work.

These displaced farm workers provided a pool of labor to tend machines in the growing manufacturing cities.

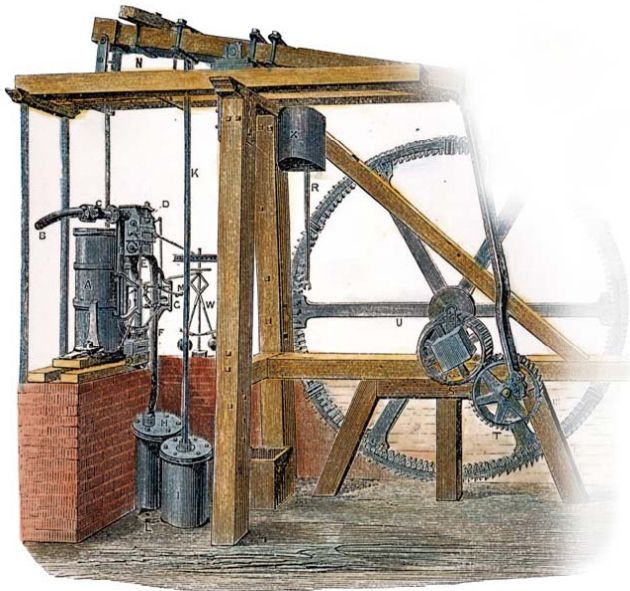**This agricultural revolution caused a population explosion in Europe.**

	1700	1800
Britain	5,000,000	9,000,000
Europe	120,000,000	190,000,000

- Greater and more consistent food production reduced the impact of famines.

- Improvements in hygiene, sanitation, and medical care improved health.

New technology helped trigger changes.

- In 1709 Abraham Darby found a way to **smelt** iron using coal instead of charcoal.

- The result was a less expensive and better-quality iron useful to make parts for steam engines.

- His son and grandson continued to perfect the process, which led to iron bridges and railroad tracks.

New materials and forms of energy played key roles in the Industrial Revolution.

- In 1712 Thomas Newcomen invented a steam engine to pump water from mines.

- In 1764 **James Watt** set out to make Newcomen's engine more efficient.

- Watt's engine became the power source to run factories, trains, and steamships.

During the 1700s, coal was harnessed to produce steam for power.

New technology quickly changed people's lives.

anesthetics	• Pain could be reduced during surgery and other procedures.
telegraph	• Messages could instantly be sent long distances.
sewing machine	• Machines could stitch far faster than a seamstress.
antiseptics	• Reducing infections saved lives.

Section Review

QuickTake Quiz

Know It, Show It Quiz

<u>Objectives</u>

- Understand why Britain was the starting point for the Industrial Revolution.

- Describe the changes that transformed the textile industry.

- Explain the significance of the transportation revolution.

Terms and People

- **capital** – money to invest in enterprises

- **enterprise** – a business organization in an area such as shipping, mining, railroads, or factories

- **entrepreneur** – someone who manages and assumes the financial risks of starting a new business

- **putting-out system** – cottage industry; raw cotton was distributed to peasant families, who spun it into thread and then wove the thread into cloth in their homes

Terms and People (continued)

- **Eli Whitney** – in 1793, invented the cotton gin, which sped up the previously time-consuming job of separating cotton fibers from cotton seeds

- **turnpike** – private road built by an entrepreneur who charged travelers a toll, or fee, for use

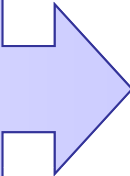- **Liverpool** to **Manchester** – site of the world's first major rail line in 1830

What key factors allowed Britain to lead the way in the Industrial Revolution?

Changes in agricultural practices fueled population growth but left many farmers homeless and jobless. The population boomed in the towns and cities as people migrated from rural areas. These migrants provided labor for factories and coal mines.

Population growth was one of several factors that led to the Industrial Revolution in Britain.

A number of characteristics made Britain ripe for industrialization in the eighteenth century.

Britain had plentiful natural resources, including:

- Natural ports
- Navigable rivers
- Water for canals
- Access to the sea
- A plentiful supply of coal
- Vast supplies of iron

England's Resources and Industries, 1750

In the 1700s, Britain had skilled inventors, a ready workforce, and a growing population.

To meet the growing demand for jobs and products, one more thing was needed.

Money to start new businesses.

Entrepreneurs needed **capital,** or money to invest, in business **enterprises** such as shipping, mining, and manufacturing.

From the mid-1600s, England had prospered from trade.

A business class had accumulated the needed capital.

With a healthy economy, many were now willing to risk their money on new ventures.

Britain had additional advantages.

- Britain had a stable government that supported economic growth.

- Other countries had river tolls, but Britain had no such barriers.

- The powerful British navy protected shipping and overseas trade.

In the 1600s, cotton cloth from India became popular in Britain. Using the **putting-out system,** merchants began a cotton cloth industry in Britain.
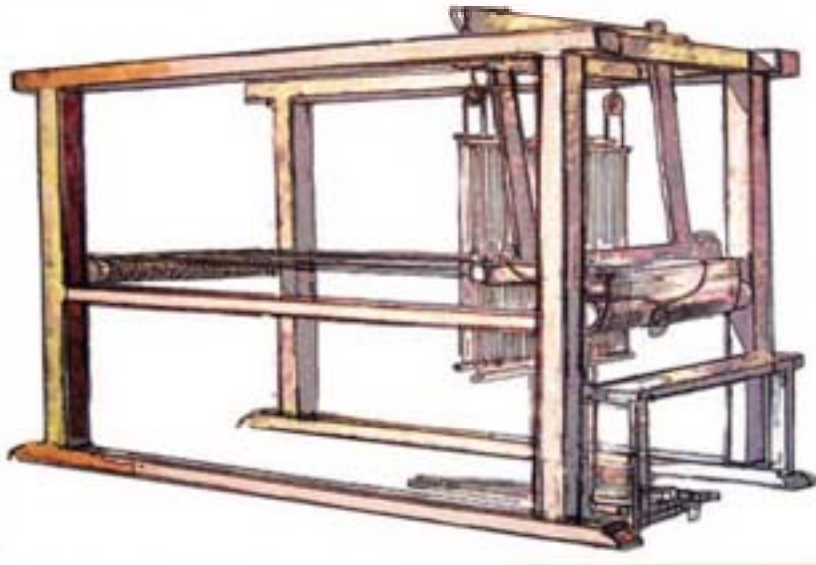
Merchants gave cotton to peasant families, who spun thread and wove cloth at home as a cottage industry.

Skilled artisans in towns then finished and dyed the cloth.

The demand for cotton cloth products, or textiles, made it Britain's largest industry.

The putting-out system was too slow to meet the growing demand for cotton cloth.

New inventions would help to increase and speed up production.

John Kay's flying shuttle, 1733

- The flying shuttle sped up weaving.

- The spinning jenny spun several threads at once.

- The water frame used water to power the process.

But the new machines posed a problem. How could farmers provide enough cotton to meet English demand?

- It took a long time to separate cotton fibers from the cotton seeds, limiting production.

- In 1793 an American, **Eli Whitney,** invented the cotton gin, which quickly did the job.

- Cotton production soon increased exponentially.

The new machines doomed the putting-out system.

Machines were too large to put in peasant homes, so they were placed in large sheds along swift-moving rivers, which provided power. Workers came to labor in these factories.

Factories brought together workers and machinery to produce large quantities of goods.
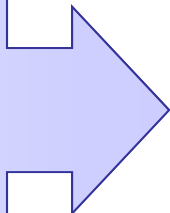
As production increased, cheaper ways were needed to move products.

Some entrepreneurs invested in **turnpikes.**

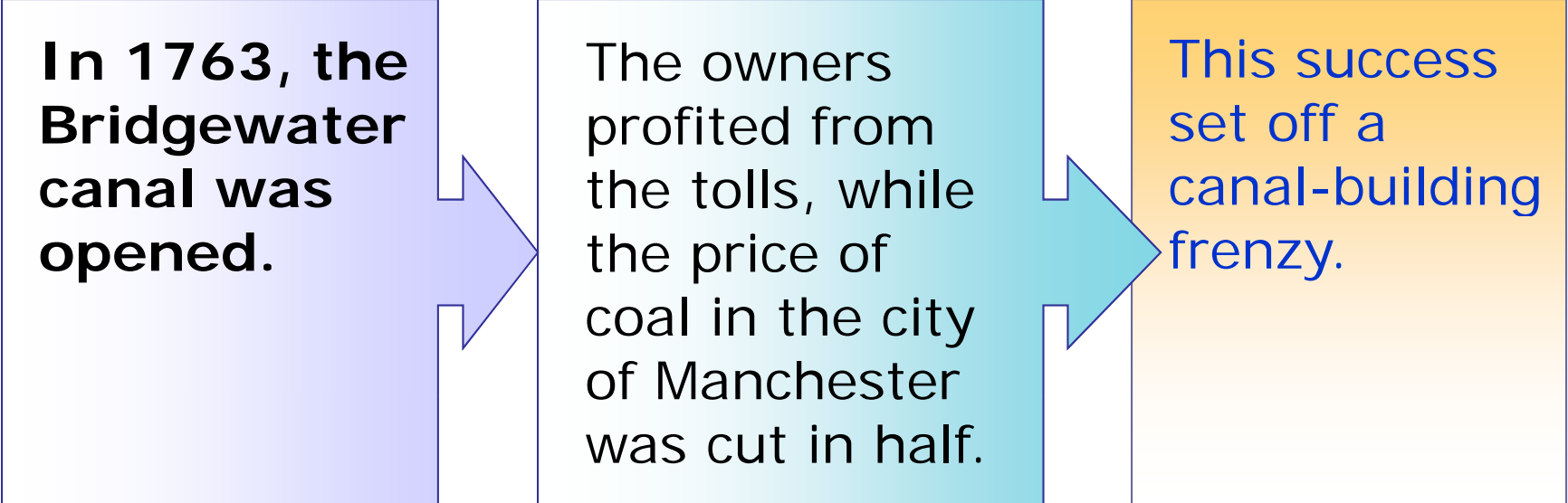Products traveled faster on these roads.

England was soon linked by a series of roads.

Factory owners needed still more efficient and inexpensive ways to move goods.

• Canals were dug to link rivers or to connect inland towns to coastal ports.

• Engineers designed stronger bridges and upgraded harbors.

In 1763, the Bridgewater canal was opened.

The owners profited from the tolls, while the price of coal in the city of Manchester was cut in half.

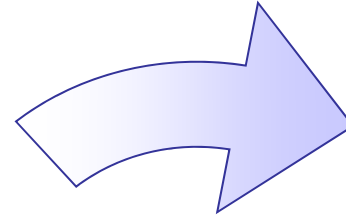This success set off a canal-building frenzy.

Railroads did not have to follow rivers, allowing the shipment of goods efficiently and quickly over land.

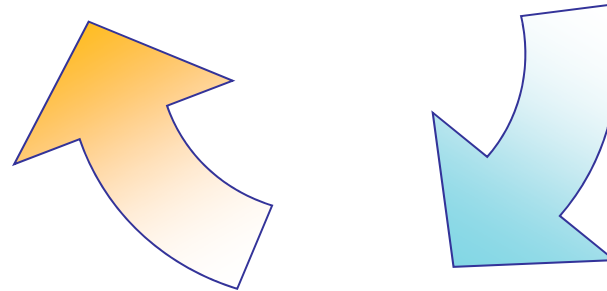The **Liverpool** to **Manchester** line opened in 1830. It began a railroad-building boom.

Railroad lines crisscrossed England, Europe, and the United States by 1870.

The new technology set off a cycle that dramatically affected how people lived.

More affordable goods caused still lower prices.

Lower prices created more consumers and greater demand.

Greater demand led to new inventions and still more affordable goods.

Section Review

QuickTake Quiz

Know It, Show It Quiz

Objectives

- Explain what caused urbanization and what life was like in the new industrial cities.

- Compare and contrast the industrial working class and the new middle class.

- Understand how the factory system and mines changed the way people worked.

- Analyze the benefits and challenges of industrialization.

<u>Terms and People</u>

- **urbanization –** the movement of people to cities

- **tenement –** crowded, multistory building divided into apartments

- **labor union –** workers' organization

What were the social effects of the Industrial Revolution?

The Industrial Revolution brought great riches for entrepreneurs. Millions of workers, however, lived in povery. As standards of living increased, all of society benefited from industrialization.
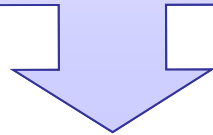
Until then, working people suffered in dangerous and unsanitary conditions, overcrowded housing, and unrelenting poverty.

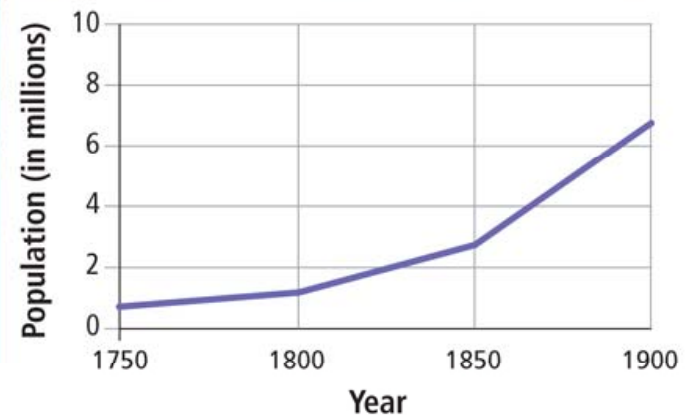**The Industrial Revolution brought rapid urbanization.**

- Changes in farming, rising population, and the need for workers led people to migrate to cities.

- Overnight, towns and cities near coal or iron mines mushroomed.

- Manchester grew from 17,000 people in the 1750s to 70,000 in 1801.

The rapid growth of population and industry changed the distribution of two key resources.

People and labor

Population Growth in London, c. 1750–1900

SOURCE: *International Historical Statistics, Europe 1750–1993, 1998*

The Industrial Revolution created a new middle class, or bourgeoisie.

The middle class lived in clean neighborhoods with running water and paved streets. Women stayed home to raise their children.
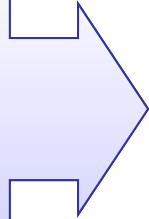
They included merchants, inventors, investors, and "rags-to-riches" individuals who were admired for their hard work and "get-ahead" attitude.

The cities where the working class lived were crowded, dark, dirty, and smoky.

- The poor lived in tiny, crowded rooms in multistory **tenements** packed into vile-smelling slums.

- Lack of sanitation left waste and rotting garbage in the streets, creating a terrible stench.

- Raw sewage was dumped in rivers, contaminating drinking water and spreading disease.

Organizations such as labor unions were illegal.

Frustrated workers tried to organize secretly, but they lacked a political voice and were powerless to affect change.

Frustration at times turned to violence:

- Between 1811 and 1813, textile workers rioted.

- Groups called Luddites smashed labor-saving machines that were replacing workers.

Many workers were comforted by religions such as Methodism, founded by John Wesley in the 1700s.

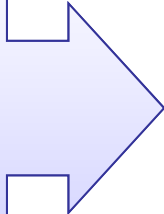|		
Wesley encouraged self-improve- ment through adopting sober and moral ways.	Meetings featured hymns and sermons stressing forgiveness and salvation.	Methodism rekindled workers' hopes and channeled anger into reform.

The heart of the industrial city was the factory.

The technology of the machine age and the rapid pace of industrialization imposed a harsh new way of life on factory workers.
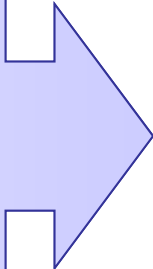
Factory workers lived and worked in unpleasant conditions.

In rural villages people worked hard, but work varied by the season. They controlled their own work pace.

- In factories the work pace was rigidly set. Shifts lasted 12 to 16 hours.

- Tired workers were easily hurt by machines with no safety devices. Textile factory air was polluted with lint.
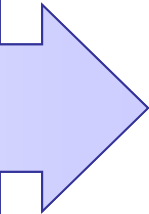
Most early factory workers were women.

- Women could be paid half what men earned.

- They were considered easier to manage.

- It was believed they could adapt better than men.

- This created a double burden on women.

- After 12 hours of work, they returned home to care for their families in damp, crowded tenements.

Working conditions in the mines were even worse than in factories.

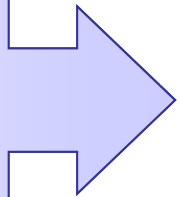Miners earned more than factory workers, but conditions were more dangerous.

- Crippling coal dust filled workers' lungs.

- There were dangers of cave-ins, floods, and explosions.

- They worked long hours in darkness.

Child labor was an accepted practice.

- Most children began work at age seven or eight.

- Nimble-fingered, small, and quick, they crept into machines to change spools or repair thread.

- They worked in dust- and lint-filled rooms.

- Children in mines worked in the dark and dampness for long hours, often doing hard labor.

Child labor reform laws called "factory laws" were passed in the early 1800s.

- Children's workdays were reduced to 12 hours.

- Children under eight were removed from the cotton mills.

New laws in the 1830s and 1840s further reduced hours for women and children, sent inspectors into factories, and required that children be educated.

Since the 1800s people have debated whether industrialization was a blessing or a curse.

The industrial age brought great hardship. Pay was low, conditions were terrible, and housing was dismal.

Workers later gained the vote and political power. Wages rose in time. The cost of new products and of travel dropped.

Section Review

QuickTake Quiz

Know It, Show It Quiz

Objectives

- Understand laissez-faire economics and the beliefs of those who supported it.

- Describe the doctrine of utilitarianism.

- Summarize the theories of socialism.

- Explain Marx's views of the working class, and responses to Marxism.

Terms and People

- **Thomas Malthus** – British economist; wrote *An Essay on the Principles of Population* warning that the population would outgrow the food supply

- **Jeremy Bentham** – British philosopher and economist who advocated utilitarianism

- **utilitarianism** – the idea that the goal of society should be "the greatest happiness for the greatest number of citizens," and that this should be the basis for judging all laws

<u>Terms and People</u> (continued)

- **socialism** — the belief that the means of production should be owned and operated by and for the people in general rather than by and for private individuals

- **means of production** — farms, factories, railways, mines, and other large businesses that produce and distribute goods

- **Robert Owen** — a Utopian who set up a model community at his cotton mill in Scotland

<u>Terms and People</u> (continued)

- **Karl Marx** — German philosopher who, with Frederick Engels, published *The Communist Manifesto* predicting class struggle

- **communism** — in practice, a system in which a small elite controlled the political and economic life of a nation

- **proletariat** — society's "have nots," the working class

- **social democracy** — a political ideology favoring gradual transition from capitalism to socialism
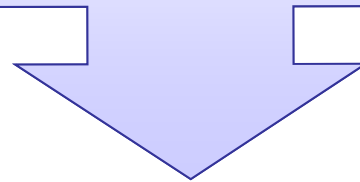
What new ideas about economics and society were fostered as a result of the Industrial Revolution?

In 1798, Thomas Malthus concluded that poverty was unavoidable because the population was increasing faster than the food supply. Malthus was one of many thinkers who tried to understand the staggering changes of the Industrial Age.

As heirs to the Enlightenment, these thinkers looked for natural laws that governed the world of business and economics.

Thomas Malthus was an English economist who carefully studied the impact of the population explosion in eighteenth-century Britain.

He concluded that poverty was unavoidable because the population was growing faster than the nation's ability to grow food.

Malthus said that unless the working class had fewer children, they were doomed to remain in poverty.

He felt that "natural events" such as famine or war were the only mechanisms to maintain a sustainable population.

Many agreed with Malthus, but he proved to be wrong. Food production rose quickly over the next century.

Eighteenth-century thinkers such as Malthus believed that natural laws govern the world of business and economics.

They believed these laws should be allowed to operate without any government interference.

This attitude of keeping "hands off" was called "laissez-faire."

Most famous among these thinkers was Adam Smith. Most middle-class capitalists agreed with his laissez-faire approach to capitalism.

Supporters of free-market capitalism saw the success of the industrial age, in which government played no part, as evidence for laissez-faire.

Another British laissez-faire economist was David Ricardo.

Like Malthus, Ricardo saw no hope for the working class to escape poverty.

Ricardo opposed help for the poor, contending that this would only lead them to have more children.

Malthus and Ricardo saw the best cure for poverty as the "laws of the free market" and advised the poor to be thrifty, work hard, and have fewer children.

Other thinkers, such as Jeremy Bentham, believed there should be some government intervention in the economy.

Bentham believed that the goal of society should be "the greatest happiness for the greatest number of citizens." This idea was called **utilitarianism.**

Laws should be judged by their utility to benefit people.

A follower of Bentham was John Stuart Mill.

- Like Bentham and Smith, Mill believed in individual freedom.

- But he also believed, *"The only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others."*

- Mill saw capitalists harming workers. He called for limiting their power to do so by giving workers the right to vote.

The champions of laissez-faire economics praised individual rights, whereas socialists focused on the good of society in general.

Capitalism:
Individuals should own and operate the **means of production** for profit.
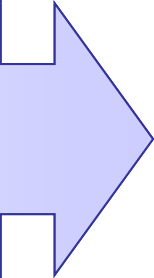
Socialism:
The people as a whole should own and operate the means of production for the general good.

Socialists set up communities where work was shared and property was commonly owned.

These early socialists were called Utopians. The name implied impractical dreamers.

Robert Owen set up a Utopian community at his cotton mill in New Lanark, Scotland.

Owen's model community was intended to show that mill owners could make a profit and still offer decent wages and conditions.

At New Lanark, Owen:

- Raised wages

- Provided schools

- Refused to use child labor

- Built homes for workers

- Ran a profitable business

German philosopher Karl Marx condemned the ideas of the Utopians as unrealistic idealism.
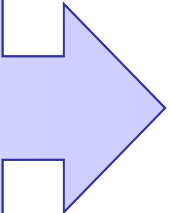
He formulated a new theory of "scientific socialism."

Along with Englishman Frederick Engels,
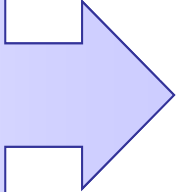**Marx published *The Communist Manifesto***
in 1848.

- He predicted a struggle between the social classes that would lead to a classless society.

- The workers would take over all of the means of production, such as the farms, factories, and railways, and run them for the public good.

Marx theorized that all of history was a struggle between the "haves" and the "have-nots."

- In industrialized Western Europe, the "haves" were the business owners or bourgeoisie.

- The "have-nots" were the workers, or **proletariat.**

- In the end, the proletariat would unite along class lines, take control of the means of production, and end the struggle.

Marx called for workers everywhere to unite and overthrow the capitalists.

- In Germany, socialists adapted Marx's beliefs to form **social democracy**, a political ideology calling for a gradual transition from capitalism to socialism.

- Russian socialists embraced Marx's ideas and set up a communist-inspired government in 1917.

Revolutionaries around the world adapted Marx to their local goals and needs.

But workers worldwide never united as a class.

The later failures of communist nations illustrated flaws in Marx's theories.

Section Review

QuickTake Quiz

Know It, Show It Quiz