CHAPTER 33

Rise of Industry
1500 A.D.–1880 A.D.

- 1543: Copernicus proposes sun-centered solar system
- 1733: John Kay invents the flying shuttle
- 1769: James Watt perfects the steam engine
- 1847: Samuel Colt develops assembly line
- 1879: Thomas Edison develops electric light

Edison phonograph

Parts of a steam engine
Many of the changes that occurred during the Industrial Revolution grew out of changes in scientific thinking. Beginning in the 1400s, scientists started to break away from old ideas. They used the scientific method to form and test their own hypotheses. This became known as the Scientific Revolution.

Nicolaus Copernicus (kuh per’ nuh kuhs) was one of the first people to use the scientific method. Copernicus was a Polish astronomer who studied the motion of the planets. What he saw proved to him that Ptolemy was wrong and that Earth was not the center of the universe. In 1543, Copernicus published a book explaining his idea that planets revolve around the sun rather
<table>
<thead>
<tr>
<th>NAME</th>
<th>FIELD</th>
<th>ACCOMPLISHMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannes Kepler</td>
<td>Astronomy</td>
<td>announced laws of movement of planets, 1609</td>
</tr>
<tr>
<td>William Harvey</td>
<td>Medicine</td>
<td>published theory on human blood circulation, 1628</td>
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<tr>
<td>Sir Isaac Newton</td>
<td>Physics</td>
<td>stated laws of motion and theory of gravitation, 1687</td>
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<tr>
<td>Antoine-Laurent Lavoisier</td>
<td>Chemistry</td>
<td>discovered nature of combustion, 1777</td>
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<tr>
<td>John Dalton</td>
<td>Chemistry</td>
<td>announced atomic theory, 1803</td>
</tr>
<tr>
<td>Maria Mitchell</td>
<td>Astronomy</td>
<td>discovered new comet, 1847</td>
</tr>
<tr>
<td>Charles Darwin</td>
<td>Biology</td>
<td>advanced theory on development of plants and animals, 1858</td>
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<tr>
<td>Gregor Mendel</td>
<td>Botany</td>
<td>discovered principles of heredity, 1866</td>
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<tr>
<td>Louis Pasteur</td>
<td>Medicine</td>
<td>advanced germ theory of disease, 1876; developed a rabies vaccine, 1885</td>
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<tr>
<td>Pierre Curie</td>
<td>Chemistry</td>
<td>discovered radium and polonium, 1898</td>
</tr>
<tr>
<td>Marie Curie</td>
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than around Earth. This book began a complete change in scientific thinking.

Another important scientist was the Italian astronomer Galileo Galilei (gal uh lē’ ō gal uh lā’ ē). He invented a telescope and began to study the stars and planets. He learned that the moon’s surface is not smooth but has mountains and craters. He learned that the Milky Way holds a vast number of stars and that the sun rotates on its axis. Galileo was strongly criticized by the Roman Catholic Church for teaching that Earth revolves around the sun. Even so, Galileo’s ideas spread throughout Europe.

In 1642, the same year Galileo died, another important scientist, Sir Isaac Newton (ı¯’ zuhk nūt’ n), was born in England. It was Newton who explained the theory of gravitation and how objects move through space. The technology for today’s rockets and space satellites is based on his work.

It was at this time that scientists in Great Britain and France formed organizations in which they could discuss their ideas and research. In this way, scientific information began to spread more quickly. Soon, thousands of people were using the scientific method to add to their knowledge and improve their lives.

**Section 1 Assessment**

1. What scientific discoveries were made by Galileo Galilei?
2. Why were Sir Isaac Newton’s theories important?

**Critical Thinking**

3. **Making Generalizations** Why were the early 1400s known as the Scientific Revolution?

**Graphic Organizer Activity**

4. Draw this diagram, and use it to show some of the new ideas developed during the Scientific Revolution. (Add circles as needed.)

**SECTION 2 Agricultural Revolution**

As changes were taking place in science, there were new developments in farming. These changes were called the Agricultural Revolution. It set the stage for the Industrial Revolution.

By the 1700s, a system of land division called enclosure (en klo’ zhuhr) was in use in Great Britain. Landowners combined the many small strips of land worked by tenant farmers into large areas closed in by fences, hedges, or ditches. Enclosure allowed landowners to make more money. Whole areas could grow the same crop, which meant larger harvests and greater profits. Landowners also needed fewer workers.
The tenant farmers had two choices. They could stay on as paid workers, or they could look elsewhere for jobs. Most left to find work in other places. They moved to cities and became industrial workers.

Enclosure was just part of the revolution in agriculture. New ways of growing crops and breeding animals were also developed. These changes led to greater production of food. More food meant better health and longer life spans. Population increased, and the demand for manufactured goods grew.

**SECTION 2 Assessment**

1. **Define**: enclosure.
2. How did landowners use the enclosure system?
3. How did the growth of population influence the Industrial Revolution?

**Critical Thinking**

4. **Making Comparisons** Do you think agriculture was more or less important in the 1700s than it is today in Great Britain?

**Graphic Organizer Activity**

5. Draw this diagram, and use it to show some of the effects of the enclosure system.

**SECTION 3 Industrial Revolution**

The Industrial Revolution began in the early 1700s. It was a long, slow process at first. However, as one development led to another, the revolution moved faster and faster. Much of the world changed. By the 1850s, the changes had become so widespread that people realized they were entering a new age.

**The Textile Industry**

The Industrial Revolution began in Great Britain in the textile (tek’ stuhl), or woven cloth, industry. In the 1600s and early 1700s, cloth was made by the domestic system. Under this system, most work was done in workers’ cottages, where families worked together. Merchants went from cottage to cottage, bringing the workers raw wool and cotton. Using hand-powered spinning wheels and looms, the workers would spin the thread and weave it into wool and cotton cloth. The merchants then picked up the finished cloth to sell.

The domestic system could not meet the strong growing demand for cloth. Before long, people started looking for ways to make more cloth in less time. The first major breakthrough came in 1733 when a British inventor named John Kay invented the
flying shuttle. It was mounted on rollers, and one weaver could send it rapidly from one side of a loom to the other. It cut in half the time needed to weave cloth. Now, however, spinners could not keep up with the weavers. Then, in 1764, James Hargreaves (hahr’ grēvz), a British carpenter, invented the spinning jenny. It had a number of spindles fastened to a single wheel. The jenny made it possible for one person to spin many threads at the same time.

More progress was made when ways were found to use the power of falling water instead of hand power to run textile machines. This meant, however, that the machines had to be near a large water supply. Accordingly, factories were built next to rivers that could supply the necessary water power. This was the beginning of the factory system, which brought workers and machines together in one place to make goods. Workers still lived in their cottages, but they went to factories to work. In time, towns grew up around these factories.

Water power did not work very well with heavy machinery. So, people began looking for still another source of power. In 1769, a Scottish mechanic named James Watt perfected the steam engine. Steam soon replaced water as the major source of power. Factories of all kinds could now be set up near raw materials and town markets.

Cotton farmers in America and in India could not supply enough raw cotton to meet the needs of British textile factories. Eli Whitney (é’ İ hwit’ nē), an American inventor, found a way to solve this problem. While visiting a cotton plantation in Georgia, he learned that it took a great deal of time to clean the seeds out of cotton by hand. In 1793, with the help of Catherine Littlefield Greene, he invented the cotton gin, or cotton-cleaning machine. It could clean cotton 50 times faster than a person working by hand. If it were driven by water power, it could clean cotton 1,000 times faster.

Organizing Production About five years later, Whitney developed a new way of organizing production. This was the system of interchangeable parts, which means that a certain part of a product is the same size and shape as that same part in another product. Whitney first used interchangeable parts in the making of guns. Until that time, each gun was made individually, and no two guns were alike. Broken parts had to be specially made by a skilled worker in order to fit a specific gun. Whitney’s use of parts of identical size and shape made it possible for less-skilled workers to make or fix guns much faster.

Other Americans also developed new ways of organizing production. In the late 1700s, a shopkeeper-mechanic named Oliver Evans was the first to use automation, or the process in which machines instead of people do much of the labor. Evans’s

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**Reading Check**

- Why was the flying shuttle important?
- Who invented the spinning jenny?

**Reading Check**

- How did the factory system differ from the domestic system?

**Reading Check**

- Who invented the cotton gin, and what did this machine do?

**Reading Check**

- What changes did the use of interchangeable parts bring to production?

**Reading Check**

- What is automation?
automated flour mill was water-powered and cut by four-fifths the number of workers needed to run it.

In 1847, Samuel Colt used Whitney’s idea of interchangeable parts to develop the **assembly line.** On an assembly line, each worker adds a part of the product and passes it on to the next worker, who also adds a part, until the entire product has been put together. Colt used the assembly line to produce the Colt revolver. Before assembly lines, a skilled worker had to make one product at a time from start to finish. With the assembly line, work could be divided, and many products could be put together at one time by unskilled workers. All of these discoveries and new techniques greatly increased production.

**Iron, Coal, and Steel** To build machine parts, iron was needed. To fire steam engines, coal was needed. Without iron, coal, and steel, which replaced iron, the Industrial Revolution could not have continued.

By the early 1700s, ironmaking had become expensive. To smelt iron, the British used **charcoal,** a fuel that is made by burning wood. The British, however, were running out of

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**SEWING MACHINE** Isaac Singer oversees a demonstration of his first sewing machine. What invention benefited the textile industry during the early 1800s?

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**Robert Fulton**

**1765–1815**

**American Inventor**

Born near Lancaster, Pennsylvania, Robert Fulton had many talents. He was an expert gunsmith and an accomplished landscape painter. He also designed torpedoes and early submarines. Fulton is best known for launching the **Clermont,** the first commercially successful steamboat in America.
forests, which made wood scarce and costly. In 1753, a way was found to use coal instead of charcoal for smelting. As a result, iron became cheaper, iron production grew, and coal mining became a major industry.

Iron, however, was too brittle for rails, bridge supports, and heavy equipment. In 1856, a British inventor named Henry Bessemer (bes’ uh muhr) found a cheap way of removing the impurities from iron to make steel, which was harder and stronger than iron. The Bessemer Process lowered the cost of making steel from $200 a ton to $4 a ton. Seven years later, in 1863, Pierre-Émile Martin of France and William Siemens of England invented the open-hearth process, which used a special kind of furnace to make steel. It was even cheaper than the Bessemer Process and could turn out many different kinds of steel. Soon, mining towns and steel centers grew up in areas with supplies of iron ore and coal.

**Transportation** Raw materials and finished products had to be moved quickly and cheaply. Before this could happen, transportation had to be improved. Until the 1700s, the chief means of transportation over land was by horse or horse-drawn wagon. Roads were no more than rough and narrow dirt paths. Travel was slow and uncomfortable. It was even worse when rain made the roads muddy.

Late in the 1700s, the British began to improve their roads. A Scottish engineer named Thomas Telford (tel’ fuhrd) designed roadbeds so that water would drain off the roads. Another Scottish engineer, John L. McAdam, developed what became known as the macadam (muh kad’ uhm) road. It had a surface made of layers of crushed stone. This surface allowed horse-drawn wagons to use the roads in all kinds of weather and to travel faster.

The British also made their rivers wider and deeper and built canals to connect navigable rivers to factory and mining centers. Horses walked beside canals and pulled barges. The barges were slow but could carry 50 times the amount of goods that horse-drawn wagons could. By 1830, Great Britain had a complete system of inland waterways.

The biggest improvement in land transportation was the railroad. For years, donkeys had pulled carts over wooden rails inside coal mines. Then, the production of iron grew. The wooden rails were replaced by iron ones that could carry heavier loads. Inventors began to build locomotives to run on iron rails. In 1829, George Stephenson (stē’ vuhn suhn), a British mining engineer, won a contest to see who could build the best locomotive. Stephenson’s locomotive, the Rocket, could pull a train about 36 miles, or 58 kilometers, an hour. The Rocket started a railroad-building boom in Great Britain and around the world.

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**A High Railway** In 1870, an American engineer named Henry Meiggs built what is still the world’s highest railroad—the Central Railway—across the Andes Mountains in Peru. At its highest point, the Central Railway reaches an altitude of nearly 16,000 feet, or 4880 meters, higher than the tallest peak in the Alps.
Railroads changed daily life as well as transportation. People started using such phrases as “keeping on track” and “tooting your own whistle.” They also collected autographs of railway engineers. When American railroads adopted standard time zones in 1883, everyone else in the United States did too. The next year, time zones were established all over the world.

The biggest improvement in water transportation was the steamboat. The first practical one was developed by Robert Fulton (fūl’ tuhn), an American inventor. In 1807, Fulton’s Clermont, powered by a British steam engine, set a record by making the trip from Albany to New York City in 32 hours. Soon, steamboats were carrying passengers and goods along the inland waterways of the United States and Europe. Steamboats, however, did not replace sailing ships in trans-oceanic travel until the late 1800s, when fuel-efficient engines were developed.

Section 3 Assessment

1. Define: textile, domestic system, flying shuttle, spinning jenny, factory system, cotton gin, interchangeable parts, automation, assembly line, open-hearth process, macadam road.

2. What effect did the assembly line have on the type of workers needed for production?

3. Why did transportation have to be improved during the Industrial Revolution?

Critical Thinking

4. Predicting Consequences Suppose the steam engine was never invented. Do you think the Industrial Revolution would have still occurred? Why or why not?

Graphic Organizer Activity

5. Draw this diagram, and use it to weigh the pros and cons of using an assembly line to produce goods.

<table>
<thead>
<tr>
<th>Use of Assembly Line</th>
<th>Pros</th>
<th>Cons</th>
</tr>
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</table>

SECTION 4 Industrial Impact

The Industrial Revolution brought many changes in people’s lives. These changes showed up first in Great Britain. They then spread to other countries.

Changes in Society In England, until the Middle Ages, there had been two major social classes—the nobles, who were the upper class, and the peasants, who were the lower class. Then, a middle class of rich merchants developed.
During the Industrial Revolution, the middle class increased in numbers and grew richer. Many factory, railroad, and mine owners became as wealthy as the nobles. They began to keep servants and to dress like members of the upper class. Women wore lacy petticoats and hooped skirts with stiff linings. Men wore dark suits, with top hats in winter and boaters, or stiff straw hats, in summer. Members of the middle class had iron ranges for cooking and gave huge dinner parties. Middle-class families began spending their weekends at seaside resorts, which were easy to reach now that railroads were common. Middle-class children went to upper-class schools.

In time, the middle class gained political power. In Great Britain, its male members gained the right to vote and to be represented in Parliament.

The Industrial Revolution also created an industrial working class. Most members of this class were peasants who could no longer support themselves by farming. Since they had no property of their own to sell, they had to sell their labor in order to live.

Members of the working class did not benefit from the Industrial Revolution in its early years. They worked 12 to 16 hours a day, six days a week, for low wages. They had to work at the pace set by machines and factory owners and were fined or...
beaten if they did not keep up. Working conditions were difficult, dirty, and dangerous. Many people were killed or injured by unsafe machinery. The working class did not have job security. Factory and mine owners hired and fired whenever they wanted.

Most children of the working class did not have time to go to school or to play. Instead, they worked in factories and mines along with men and women. Employers often preferred to hire children since they could be paid even less than adults. Another reason was that in mines, children could crawl through narrow tunnels into which adults could not fit. Children sometimes were crippled by this difficult work.

**The Growth of Cities**

Another change brought by the Industrial Revolution was the growth of cities. Before the Industrial Revolution, less than 10 percent of the people in Great Britain lived in cities. By 1900, the number had reached 75 percent. Indeed, 10 percent of the people in the whole country lived in the city of London.

Some cities grew up around factories or mines that had been built in rural areas. Most factories, however, were built in existing cities, which grew rapidly as people moved there to find jobs. Soon, the cities became overcrowded. Houses could not be built fast enough. Sometimes, a dozen people had to live in one room. Many moved into damp basements or rooms with no windows. Garbage floated in the streets because sewers had not yet been built. Water supplies became polluted. Epidemics of cholera (kol’ uhr uh), typhoid, and tuberculosis were common. The death rate

**INDUSTRIAL CITIES**

The development of industry in England led to the growth of large cities. English industrial cities were located near coal or iron deposits. This painting shows a nineteenth-century steel factory in the city of Sheffield. Why could workers in the city do nothing about their working or living conditions?
among the working class was more than twice that of the middle and upper classes.

Workers had little economic or political power. It was against the law to form **trade unions**, or workers’ associations. Workers did not have the right to vote. For these reasons, they could do nothing about their working or living conditions.

**Reform**

Most people in the middle and upper classes paid little attention to the suffering of the workers. Factory owners, for example, felt that raising wages and improving working conditions would raise the cost of goods and lower profits. Some, however, believed that higher wages and better working conditions could produce good profits. They began to work for reform.

The reformers started schools, orphanages, and hospitals for the poor. They also worked to change laws. In 1824, trade unions were made legal. During the 1830s and 1840s, children under ten years old and women were prohibited from working underground in mines. The workday was cut to ten hours.

The reformers also worked to improve living conditions. New laws required public sewer systems and the building of better houses. Every room had to have at least one window, and every house had to have piped-in water. Over time, life became better for the working class. There were fewer epidemics. Clothing, food, and other products became cheap enough for the workers to buy.

**Section 4 Assessment**

1. Define: trade unions.
2. What problems were caused by the rapid growth of cities?
3. Why were some people against reform?
4. **Demonstrating Reasoned Judgment**
   What reforms would you have worked for if you had lived during the Industrial Revolution?

**Graphic Organizer Activity**

5. Draw this diagram, and use it to support this generalization: The Industrial Revolution brought many changes to people’s lives. (Add answer lines as needed.)

   **Generalization**
   1. 
   2. 
   3. 
   4. 
   5.

**SECTION 5 Spread of Industry**

Meanwhile, the Industrial Revolution spread from Great Britain to other countries. These countries, aided by technology, soon **industrialized**, or built up industry. The expansion of railroads and transportation were also important factors.

**Reading Check**

- What were trade unions?
- What happened when countries industrialized?
Other Countries At the beginning of the Industrial Revolution, Great Britain tried to keep its inventions secret. Machines or plans for machines were forbidden to be taken out of Great Britain. Skilled workers were forbidden to leave the country. By the 1800s, however, many workers had ignored the law and left. Other nations welcomed these immigrants, or people who settle permanently in a different country, because they brought British industrial secrets to their new homelands.

These countries used what they learned to build their own industries. Belgium, with its rich deposits of iron and coal, was the first country after Great Britain to industrialize. The next country was France. There, the process began in the 1700s but was slowed by war and revolution. The United States, with its many natural resources, soon followed France.

Then came Germany. Although Germany was well supplied with coal and iron, it was divided into more than 30 separate states. These states were not willing to cooperate in economic matters. Germany, therefore, did not make much industrial progress until after it was unified in 1871. It then matched the others as a leading industrial power.

WORLD’S FAIR In 1851, Great Britain held the first World’s Fair in London to celebrate its industrial achievements. Other countries then began to hold similar fairs. This painting shows the royal family attending opening day. How did the Industrial Revolution spread from Great Britain to other countries?
Technological Advances  The development of new kinds of power helped continue the Industrial Revolution. One of these was electricity. In 1837, two Americans, Samuel F. B. Morse and Alfred Vail, built the first successful electric telegraph. It made quick communication possible. Some years later, Alexander Graham Bell, also an American, invented the telephone. Communications took another step forward. In 1895, an Italian physicist, Guglielmo Marconi (gù yelˈ mō mahr kəˈ nē), built the wireless telegraph, or radio. Six years later, he was able to send a message across the Atlantic Ocean.

Meanwhile, there were other advances in electricity. By 1879, Thomas Alva Edison, an American, developed the electric light. It would soon illuminate factories and homes all over the world.

Another new source of power was the internal combustion engine, or an engine that is fueled by gasoline. It was invented around 1885 by German engineer Gottlieb Daimler (gōtˈ lēb dīmˈ luhr). Daimler’s engine was used to drive the first automobile as well as other machines. Another German engineer, Rudolf Diesel, developed an oil-burning internal combustion engine that could run large industrial plants, locomotives, and ocean liners. These developments helped open a whole new era in transportation.
Section 5 Assessment

1. Define: industrialized, immigrants, internal combustion engine.
2. How did the Industrial Revolution spread?
3. What were the first countries to industrialize after Great Britain?

Critical Thinking

4. Drawing Conclusions Which of the advances in technology made during the Industrial Revolution do you consider the most important? Explain.

Graphic Organizer Activity

5. Draw this diagram, and use it to show inventions that advanced communication and the use of new forms of energy or power.

<table>
<thead>
<tr>
<th>New Inventions</th>
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<tbody>
<tr>
<td>Communication</td>
</tr>
<tr>
<td>Energy/Power</td>
</tr>
</tbody>
</table>

Chapter Summary & Study Guide

1. In 1543, Copernicus triggered the Scientific Revolution with his idea of a sun-centered solar system.
2. The Scientific Revolution helped lead to the Agricultural Revolution—a new system of land division, animal breeding, and growing crops.
3. The invention of new machines helped workers produce more goods in less time.
4. Perfection of the steam engine replaced the use of water power and allowed factories to be built near sources of raw materials.
5. Eli Whitney and Catherine Littlefield Greene invented the cotton gin in 1793. Whitney also developed the principle of interchangeable parts.
6. Automation and the assembly line increased production and reduced the need for skilled workers.
7. The development of inexpensive ways to smelt iron and make steel provided cheaper building materials for industry.
8. Improvements in transportation—better roads, canal systems, railroads, and steam boats—helped speed industrialization.
9. The Industrial Revolution increased the size of the middle class and created a new industrial working class, many of whom suffered poor living conditions in industrial cities.
10. During the 1800s, the Industrial Revolution spread from Great Britain to other countries, where inventors developed even more new ideas such as electricity and the internal combustion engine.

Self-Check Quiz
Visit the Human Heritage Web site at humanheritage.glencoe.com and click on Chapter 33—Self-Check Quiz to assess your understanding of this chapter.
CHAPTER 33 Assessment

Using Key Terms

Imagine that you are having a conversation with Thomas Jefferson about the most important ideas and innovations of the Industrial Revolution. Write out the dialogue using the following words.

- enclosure
- textile
- domestic system
- spinning jenny
- cotton gin
- automation
- open-hearth process
- trade unions
- immigrants
- flying shuttle
- factory system
- interchangeable parts
- assembly line
- macadam road
- industrialized
- internal combustion engine

Understanding Main Ideas

1. In what ways did ideas about science change in the 1400s, 1500s, and 1600s?
2. What effect did the Agricultural Revolution have on population growth?
3. How did the development of the macadam road affect transportation?
4. What benefits did people in the working class eventually receive from the Industrial Revolution?
5. What new sources of power helped spread the Industrial Revolution?

Critical Thinking

1. How did changes in agriculture influence the beginning of the Industrial Revolution?
2. Why did Great Britain want to keep its inventions secret from the rest of the world?
3. What things are necessary for a country to be able to industrialize?

4. Do you believe the Industrial Revolution was good or bad for most workers? Explain.

Graphic Organizer Activity

**Economics** Create a diagram such as the one shown, and use it to compare economic activities before and after the Industrial Revolution. (Tip: Think back to how people earned a living in the Renaissance and Middle Ages.)

**Environment and Society** Progress that came about during the Industrial Revolution was caused by people interacting with their environment. What geographic features were involved in this progress? Explain.

Using Your Journal

Review any details you may have noted about the changes that took place in the world between the 1400s and the 1800s. Write a newspaper editorial in which you give your opinion about how developments during the Industrial Revolution might cause problems for people in the future.
While western European nations pushed into the Americas, Russian czars expanded their borders both in the east and in the west. By the 1800s, Russia covered one-sixth of the earth’s surface. It extended from the Baltic Sea in the west to Alaska in the east and from the Arctic Ocean in the north to central Asia in the south. The greatest czars—rulers like Peter the Great and Catherine the Great—worked tirelessly to modernize Russia. No matter how hard they tried, however, Russia remained a mostly rural nation, with nearly all of its vast population working as serfs or living in remote villages.

Both nobles and serfs loved the folktales that formed part of Russia’s oral history. These tales drew an audience everywhere, whether it be in a peasant’s cottage or a czar’s palace. Russian artists captured scenes from these stories on beautiful lacquered boxes such as this one.

Most of the Russian empire stretched east of the Ural Mountains—the traditional boundary between Europe and Asia. Even so, the heart of the empire always lay west of the Urals—the place where the states of Rus and Muscovy were born. It was here that Russian rulers built their greatest cities and set up governments to rule their sprawling lands.
Peter the Great founded St. Petersburg on the Baltic Sea in the early 1700s. Peter tried to “westernize” Russia. He even worked to ban beards on Russian men.

By the end of the 1700s, Russia reached some 6,000 miles from east to west. The larger it grew, the more diverse its population became. Peoples ranged from the hunters of the Tungus region in eastern Siberia (right) to the peasant women of the St. Petersburg area (left). 

The skill of Russian artisans is shown in this fur-lined gold crown set with precious jewels. Crafted in the mid-sixteenth century, the crown is in a museum in the Kremlin today.

Russian serfs farmed the land, worked as servants, and generally served the nobles who owned the land on which they lived. In this painting, serfs escort a noble family through the winter countryside in a carriage.

Taking Another Look
1. What was the size and location of the Russian empire at its height?
2. How did expansion affect the population makeup of Russia?

Hands-On Activity
Writing a Letter to the Editor Write a letter to the editor of a Russian newspaper commenting on the decision to ban all beards.
1. According to the map above, what colony was located at approximately 29°N and 82°W?
   A) Cuba  
   B) Gulf of Mexico  
   C) St. Augustine  
   D) Cajamarca

Test-Taking Tip: Look at the map’s labels carefully. How does it show which labels belong to continents? To islands? To colonies?

2. According to the graph above, which colonies had the largest and smallest total populations in 1700?
   F) Virginia and Pennsylvania  
   G) Massachusetts and New York  
   H) New York and Pennsylvania  
   J) Connecticut and Maryland

Test-Taking Tip: Notice that the question asks for total population. This graph shows two different bars for each colony. Do you need to add the bars together to get the total population? Why or why not?

3. Native Americans in the Subarctic, Great Basin, and California areas relied on hunting, fishing, and gathering food. Native Americans in the Eastern Woodlands, Southwest, and Southeast became farmers. What might explain this difference?
A Native Americans in the Eastern Woodlands, Southwest, and Southeast learned how to farm from the colonists.

B Native Americans in the Subarctic, Great Basin, and California did not have farming tools.

C Native Americans in the Eastern Woodlands, Southwest, and Southeast were allowed to own land, so they could establish permanent farms.

D The climate and soil in the Subarctic, Great Basin, and California areas were not good for farming.

Test-Taking Tip: Since the “hunters” and the “farmers” came from different geographic regions, it is likely that the answer has something to do with geography. Which answer choice fits best with this information?

4. The civil war in England was fought between

   F the government and serfs
   G the monarchy and the feudal lords
   H the king and Parliament
   J England and France

Test-Taking Tip: Eliminate answers that do not make sense. A civil war is a type of war fought within one country. Therefore, answer J can be eliminated.

5. In Two Treatises of Government, John Locke wrote about certain natural rights with which all people are born. These rights did NOT include

   A life
   B liberty
   C education
   D property

Test-Taking Tip: This question asks you to make a comparison. What did all three revolutions have in common? For instance, did the American Revolution have anything to do with the role of the Church? No. Therefore, you can eliminate choice G.

6. Like the English and American revolutions, the French Revolution was fought over

   F the power of the monarchy
   G the role of the Church
   H the right to own property
   J the rights of taxpaying citizens

Test-Taking Tip: It may be helpful to remember that Locke’s ideas helped form the basis for the Declaration of Independence. What rights did the colonists most want to protect?

7. The Agricultural Revolution led to

   A a decrease in farm productivity
   B more people moving to farms to work
   C better farming technologies
   D many bloody wars between farmers and the government

Test-Taking Tip: This question asks about a different type of revolution. Remember that the Agricultural Revolution set the stage for the Industrial Revolution a hundred years later. However, neither of these revolutions involved warfare. In this case, the word revolution refers to a change in the system of farming. Therefore, you can eliminate choice D.

STOP