

More Technological Advances

What You Will Learn...

Main Ideas

1. The telegraph made swift communication possible from coast to coast.
2. With the shift to steam power, businesses built new factories closer to cities and transportation centers.
3. Improved farm equipment and other labor-saving devices made life easier for many Americans.
4. New inventions changed lives in American homes.

The Big Idea

Advances in technology led to new inventions that continued to change daily life and work.

Key Terms and People

Samuel F. B. Morse, p. 402
 telegraph, p. 402
 Morse code, p. 403
 John Deere, p. 404
 Cyrus McCormick, p. 404
 Isaac Singer, p. 405

TAKING NOTES

As you read, take notes on the new advances in technology listed in the section. Create a graphic organizer like the one shown below that identifies the effects of each.

Inventions	Effects
Telegraph	
Steam Power	
Mass Production	
Home Inventions	

If YOU were there...

You own a small shop in Chicago, Illinois, in the 1850s. You sell ladies' hats and gowns. When you need more hats, you send a letter to the manufacturer in New York. Sometimes it takes weeks for the letter to get there. One day, the owner of the shop next door tells you about a wonderful new machine. It can send orders from Chicago to New York in just minutes!

How would a machine like this change your business?

BUILDING BACKGROUND The Industrial and Transportation Revolutions had far-reaching effects on Americans' lives. They led to still more innovations in technology. Some of the new machines and devices speeded up processes for business owners. Others made life easier for people at home.

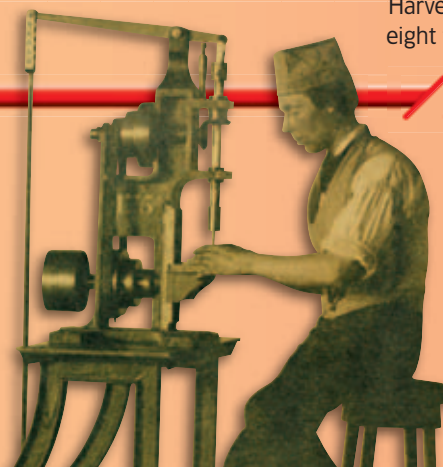
Telegraph Speeds Communication

In 1832 **Samuel F. B. Morse** perfected the **telegraph**—a device that could send information over wires across great distances. To develop the telegraph, Morse studied electricity and magnetism. In

Time Line

American Inventions

1798 Eli Whitney proposed the idea of mass producing guns. Machines like this one made it possible for workers to make interchangeable parts efficiently.



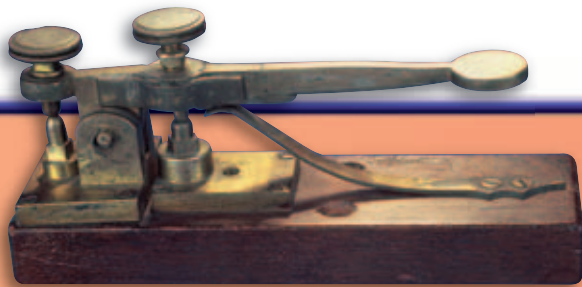
1831 Cyrus McCormick invents the mechanical reaper. Harvesting grain becomes eight times more efficient.

time, Morse put the work of other scientists together in a practical machine.

The telegraph sent pulses, or surges, of electric current through a wire. The telegraph operator tapped a bar, called a telegraph key, that controlled the length of each pulse. At the other end of the wire, these pulses were changed into clicking sounds. A short click was called a dot. A long click was called a dash. Morse's partner, Alfred Lewis Vail, developed a system known as **Morse code**—different combinations of dots and dashes that represent each letter of the alphabet. For example, *dot dot dot, dash dash dash, dot dot dot* is the distress signal called SOS. Skilled telegraph operators could send and receive many words per minute.

Several years passed before Morse was able to connect two locations with telegraph wires. Despite that achievement, people doubted his machine. Some people did not think that he was reading messages sent from miles away. They claimed that he was making lucky guesses.

Morse's break came during the 1844 Democratic National Convention in Baltimore, Maryland. A telegraph wired news of the presidential candidate's nomination to politicians in Washington. The waiting politicians responded, "Three cheers for the telegraph!" Telegraphs were soon sending and receiving information for businesses, the government, newspapers, and private citizens.



1832 Samuel F. B. Morse invents the telegraph. Long-distance communication becomes almost instantaneous.

BIOGRAPHY

Samuel F. B. Morse

(1791–1872)

Like steamboat creator Robert Fulton, Samuel F. B. Morse began his career as a painter rather than as an inventor. In 1832 Morse was a widower struggling to raise his three children alone. He became interested in the idea of sending messages electrically. Morse hoped he could invent a device that would earn him enough money to support his family. Eventually, earnings from the telegraph made Morse extremely wealthy.

Drawing Conclusions What motivated Morse to invent the telegraph?



The telegraph grew with the railroad. Telegraph companies strung their wires on poles along railroads across the country. They established telegraph offices in many train stations. Thousands of miles of telegraph line were added every year in the 1850s. The first transcontinental line was finished in 1861. By the time he died in 1872, Morse was famous across the United States.

READING CHECK Identifying Cause and Effect

What event led to the widespread use of the telegraph, and what effect did the telegraph have on cross-country communications?

1837 John Deere invents the steel plow. The tough prairie sod can be cut and the thick soil ploughed without having to constantly clean the plow.



Steam Power and New Factories

At the start of the Industrial Revolution, most factories ran on waterpower. In time, however, factory owners began using steam power. This shift brought major changes to the nation's industries. Water-powered factories had to be built near streams or waterfalls. In contrast, steam power allowed business owners to build factories almost anywhere. Yet the Northeast was still home to most of the nation's industry. By 1860 New England alone had as many factories as the entire South did.

Some companies decided to build their factories closer to cities and transportation centers. This provided easier access to workers, allowing businesses to lower wages. Being closer to cities also reduced shipping costs. Cities soon became the center of industrial growth. People from rural areas as well as foreign countries flocked to the cities for factory jobs.

Factory workers improved the designs of many kinds of machines. Mechanics invented tools that could cut and shape metal, stone, and wood with great precision. By the 1840s this new machinery was able to produce interchangeable parts. Within a short period of time, the growing machine-tool industry was even making customized equipment.

READING CHECK **Finding Main Ideas** What changes resulted from the shift to steam power?

Improved Farm Equipment

During the 1830s, technology began transforming the farm as well as the factory. In 1837 blacksmith **John Deere** saw that friends in Illinois had difficulty plowing thick soil with iron plows. He thought a steel blade might work better. His design for a steel plow was a success. By 1846 Deere was selling 1,000 plows per year.

In 1831 **Cyrus McCormick** developed a new harvesting machine, the mechanical reaper, which quickly and efficiently cut down wheat. He began mass producing his reapers in a Chicago factory. McCormick used new methods to encourage sales. His company advertised, gave demonstrations, and provided a repair and spare parts department. He also let customers buy on credit.

The combination of Deere's plow and McCormick's reaper allowed Midwestern farmers to plant and harvest huge crop fields. By 1860, U.S. farmers were producing more than 170 million bushels of wheat and more than 800 million bushels of corn per year.

READING CHECK **Summarizing** What marketing methods did McCormick use to help sell his farm equipment?



1851 Isaac Singer improves the sewing machine. The production and repair of clothing becomes much easier.

American Inventions (continued)

1849 Walter Hunt invents the safety pin.



UNITED STATES PATENT OFFICE.
WALTER HUNT, OF NEW YORK, N. Y., ASSIGNOR TO WM. RICHARDSON AND JNO. RICHARDSON.

DRESS-PIN.

Specification of Letters Patent No. 6,281, dated April 10, 1849.

To all whom it may concern:

Be it known that I, WALTER HUNT, of the city, county, and State of New York, have invented a new and useful Improvement in the Make or Form of Dress-Pins, of which the following is a faithful and accurate description.

to the bar C, (see Figs. 6, 7 and 8,) which combined with the advantages of the spring and catch, renders it equally ornamental, and at the same time more secure and durable than any other plan of a clasp pin, heretofore in use, there being no joint to break or pivot to wear or get loose as in other plans. Another great advantage unknown in other plans is the perfect convenience of

Changing Life at Home

Many inventions of the Industrial Revolution simply made life easier. When Alexis de Tocqueville of France visited the United States in the early 1830s, he identified what he called a very American quality.

“[Americans want] to be always making life more comfortable and convenient, to avoid trouble, and to satisfy the smallest wants [desires] without effort and almost without cost.”

—Alexis de Tocqueville, from *Democracy in America*

The sewing machine, first invented by Elias Howe, a factory apprentice in Lowell, Massachusetts, was one of these conveniences. **Isaac Singer** then made improvements to Howe’s design. Like McCormick, Singer allowed customers to buy his machines on credit and provided service. By 1860 Singer’s company was the world’s largest maker of sewing machines.

Other advances improved on everyday items. In the 1830s, iceboxes cooled by large blocks of ice became available. Iceboxes stored fresh food safely for longer periods. Iron cookstoves began replacing cooking fires and stone hearths.

Companies also began to mass produce earlier inventions. This allowed many families to buy household items, such as clocks, that they could not afford in the past. For example, a clock that cost \$50 in 1800 was selling for only \$1.50 by the 1850s. Additional useful items created during this period

include matches, introduced in the 1830s, and the safety pin, invented in 1849. All of these inventions helped make life at home more convenient for an increasing number of Americans.

READING CHECK Analyzing How did labor-saving inventions affect daily life?

THE IMPACT TODAY

New inventions, such as cell phones, laptop computers, and microwave ovens, continue to make life easier and more convenient for people today.

SUMMARY AND PREVIEW New machines and inventions changed the way Americans lived and did business in the early 1800s. In the next section you will learn how agricultural changes affected the South.

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Online Quiz

KEYWORD: SC7 HP12

Section 4 Assessment

Reviewing Ideas, Terms, and People

- Describe** How did the **telegraph** work?
 - Predict** What impact might the telegraph have on the future of the United States?
- Describe** How did waterpowered factories differ from steam-powered factories?
 - Explain** How did the shift to steam power lead to the growth of cities?
- Identify** What contributions did **Cyrus McCormick** and **John Deere** make to farming?
 - Analyze** What effect did new inventions have on agriculture in the United States?
- Identify** What inventions improved life at home?
 - Evaluate** Which invention do you think had the greatest effect on the daily lives of Americans? Why?

Critical Thinking

- Supporting a Point of View** Review your notes on technological advances and their effects. Then create a graphic organizer like the one below that shows the top three advances you think are most important and why.

Most Important	Why

FOCUS ON WRITING

- Describing Technological Advances** Add notes about the inventions mentioned in this section to your chart. Think about which invention you will use for your newspaper advertisement.

1859 Manufactured goods become more valuable than agricultural goods in the country’s economy for the first time. The United States is becoming a modern industrial nation.

ANALYSIS SKILL

READING TIME LINES

Which two inventions improved American agriculture?