

*INVENTIONS DURING ECONOMIC REVOLUTIONS*  
OF THE  
*19<sup>th</sup> CENTURY*



Read the two definitions below. Then answer the questions.

- **“American ingenuity”** – creativity that has helped our country grow powerful
- **Industrial Revolution** – time of rapid growth in the use of machines in manufacturing that began in the late 1700s

1. What inventions most affect your daily life?
2. What do you think was the most important invention of mankind?

As you can tell from thinking about how inventions affect you, inventions can have a large effect on daily life and society. Read about each invention and fill in the table about its purpose and effect. Then, rank the importance of inventions with one as the most important. Make sure you explain your rank in the effect column.

- 1 is the most influential
- 8 is the least influential

# Interchangeable Parts

Most people take the concept of interchangeable parts for granted today. An "interchangeable part" is a part which is pre-made and stored somewhere. When a corresponding part breaks from a machine, it is replaced by a new part. Anybody who has witnessed their parents buy a replacement piece for their car has witnessed someone taking advantage of the interchangeable part system.

Interchangeable parts did not always exist. Until the early 19th century, everything was hand made by a craftsman. You could not buy a new part if a piece of a machine broke, so fixing or replacing broken goods cost a lot of time and money.

Eli Whitney made guns using interchangeable parts in 1796. He proposed making gun parts from standard patterns (an idea that reappears in Java Beans, which is a web-site creation program). Eli Whitney received a contract to make 10,000 guns – before, thousands of contractors would have had to work to make that many guns. Soon, more peaceful manufacturers used interchangeable parts in machines such as Singer Sewing Machines, locomotives, bicycles and automobiles. Factories developed to make or use machines full of interchangeable parts.

# Spinning Jenny

Textiles, or clothing, became an incredible important part of early American industrial development. The Spinning Jenny was one of the inventions that helped the clothing industry grow. The “Spinning Jenny” was a simple wooden contraption that allowed its operator to spin several threads at once, instead of the single thread produced by the old-fashioned spinning wheel. It was simple enough to be operated by a working man or even a strong child, small enough to fit into a farmhouse kitchen and effective enough to revolutionize the production of thread. The Spinning Jenny increased the spinner's productivity in making clothes. The machines were often operated by children, who could more easily move about them. Factories contained many workers spinning clothes. The price of clothing in stores decreased and average Americans started buying clothes from stores rather than making their own clothes.

# Steel Plow

The invention of the iron plow allowed farmers to plant crops and prepare land at an amazingly fast rate in the Northeast. These plows were incredibly important in early American development. However, these early plows didn't work well once American moved to the West.

In 1836, John Deere noticed that iron plows did not work well on the rich soil in the Midwest. Every few steps, Midwestern farmers had to clean out the dirt that got stuck in the iron plow. In 1837, Deere made a plow out of a steel saw blade. The steel plow allowed farmers to farm the soil in the new Western areas.

# Steam Engine

Because of the difficulty and high cost of moving goods, Westerners remained relatively isolated from outside people and had to make all of their goods themselves rather than trading. Much like a tariff, high transportation costs prevented trade and competition between merchants based on price. But beginning in the first decade of the nineteenth century, a transportation revolution—improvements in roads, and the development of steamboats and the building of canals and railroads—rapidly diminished western isolation.

In England in 1804, Richard Trevithick developed the first successful steam engine used in a train. In



1807, Robert Fulton made the first trip in a steamboat, which was a large boat powered by a steam engine. These steam engines in boats and trains revolutionized transportation and shipping in the United States.

As steamboats became faster and more powerful, they became more and more popular. Soon they were replacing the horse and mule-powered barges on the canals. Steamboat businesses sprang up all along the waterways of New York State. By 1830, steamboats were the most popular way to travel on the rivers and waterways throughout the United States. Between 1814 and 1834, New Orleans steamboat arrivals increased from 20 to 1200 a year. The boats transported cargoes of cotton, sugar, and passengers. Throughout the east, steamboats contributed greatly to the economy by transporting agricultural and industrial supplies.

The advances of trains and railroads had numerous positive effects on the United States. Coal mining used trains to transport the coal rather than using a line of people and passing it by hand, which increased coal production from 2 1/2 million to more than 15 million tons by 1829. Also, people could transport manufactured goods all around the country, which increased competition among merchants and decreased prices. The population of the United States increased partially because food was available in a large variety at a low cost. Finally, the rail system became the most popular form of land transportation in the last half of the 19<sup>th</sup> century. By the 1850s, railways connected the Atlantic seaboard and the Midwest in the United States. In 1869, the first transcontinental route was completed to the Pacific coast. This provided the first transportation for passengers and goods (such as wood to build houses) across North America.

## Cotton Gin

The cotton gin is a device for removing the seeds from cotton fiber. The cottonseed in Colonial America was removed by hand, usually the time-consuming work of slaves. In 1794, Whitney made the cotton gin to separate seeds from cotton in America. Originally, a person had to crank the cotton gin by hand. Later, farms used horses or water to power the gin. The cotton gin increased cotton production and lowered costs, making cotton the number one selling textile.

After the invention of the cotton gin, the amount of cotton sold doubled each decade after 1800. Demand was fueled by other inventions of the Industrial Revolution, such as the machines to spin and weave it and the steamboat to transport it. By mid-century America was growing three-quarters of the world's supply of cotton, most of it shipped to England or New England where it was manufactured into cloth. This made slavery very profitable. Slavery had been declining in profitability, but the cotton gin changed that and by mid-century, the South provided three-fifths of America's exports, most of it in cotton. The South recommitted to slave labor and Natchez, Mississippi ended up having the highest concentration of millionaires in the country. Cotton became known as "King Cotton" because it dominated the politics, economics and culture of the South.

## Telegraph

Before the telegraph, important news had to be sent by letter. For example, when Samuel Morse's first wife died in New Haven in February 1825 while he was painting Lafayette's portrait in Washington, the message took four days to reach him; she had already been buried by the time he could return home. In 1838, Samuel Morse's telegraph provided a practical way to communicate over long distances.

Morse demonstrated that signals could be sent by wire. The telegraph was a communication machine that used electric current to affect an electromagnet, which moved a marker to produce written codes on a strip of paper (the invention of Morse Code). Five years after Morse first demonstrated the technology, Congress funded an experimental telegraph line from Washington to Baltimore, a distance of 40 miles. Six years later, members of Congress witnessed the sending and receiving of messages over part of the telegraph line.



The perfected telegraph revolutionized nineteenth-century communications. News that had taken days or months could be relayed in minutes by a relatively simple process and a compact machine. Not only could this telegraph machine send messages at any hour or in any weather, but it could transmit both letters and numbers and provide a permanent record on paper. Many of the discoveries made in the process of improving the Morse telegraph set in motion the invention of the marvelous communication systems we have today.

## McCormick Reaper


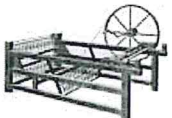





In 1831, Robert H. McCormick produced what became known as the reaper, which is a machine that helps harvest crops. Robert McCormick gave his invention to Cyrus McCormick because Cyrus was more aggressive and most business-minded. According to multiple account from members of the family and close friends, Robert had already invented the reaper after years of working on it, ran initial test trials in 1831 and gave it to his son Cyrus as a gift which Cyrus patented in 1834.

The reaper and other farm machines allowed fewer and fewer people to produce more and more food and fiber. In the process, American society was transformed. Instead of 90 percent of the population farming to meet the nation's needs, as was the case in 1831, today fewer than 2 percent of the US population are directly involved in farming. Freed from the soil, people turned their energies to industry, science, arts, and other ways to improve the quality of life in this country and around the world. His timesaving invention allowed farmers to more than double their crop size and spurred other innovations in farm machinery.

## Dynamite

Nitroglycerin in its liquid form was incredibly explosive and could be detonated to clear mountainsides and build tunnels. It could also be used for mining. However, the problem was that it was incredibly unstable and could blow up randomly, from being shaken or simple just blowing up randomly if you were carrying it and took a step forward. Alfred Nobel realized nitroglycerin's potential but knew it needed to be in a different form and mixed it with absorbent substances like sawdust or clay, and a fuse would be lit that eventually detonated the dynamite.

Dynamite revolutionized mining and the construction of tunnels, bridge and roads through mountainous areas. It became much safer to do those things and it speed up the process dramatically. It also ended up being used for destruction and warfare, so much that Alfred Nobel became horrified by what his invention was used for. He made a fortune off of weapons manufacturing, and when he realized what his legacy as going to be he dedicated his wealth to establishing the Nobel Peace Prize that would be awarded to people who sought to encourage peace or reduce conflict throughout the world.

Invention	Purpose of Invention	Rank	Invention's Effect on America
interchangeable parts 			
Spinning Jenny 			
steel plow 			
steam engine 			
cotton gin 			
telegraph 			
McCormick Reaper 			
Dynamite 