

The Revolution in Agriculture and the Second Industrial Revolution

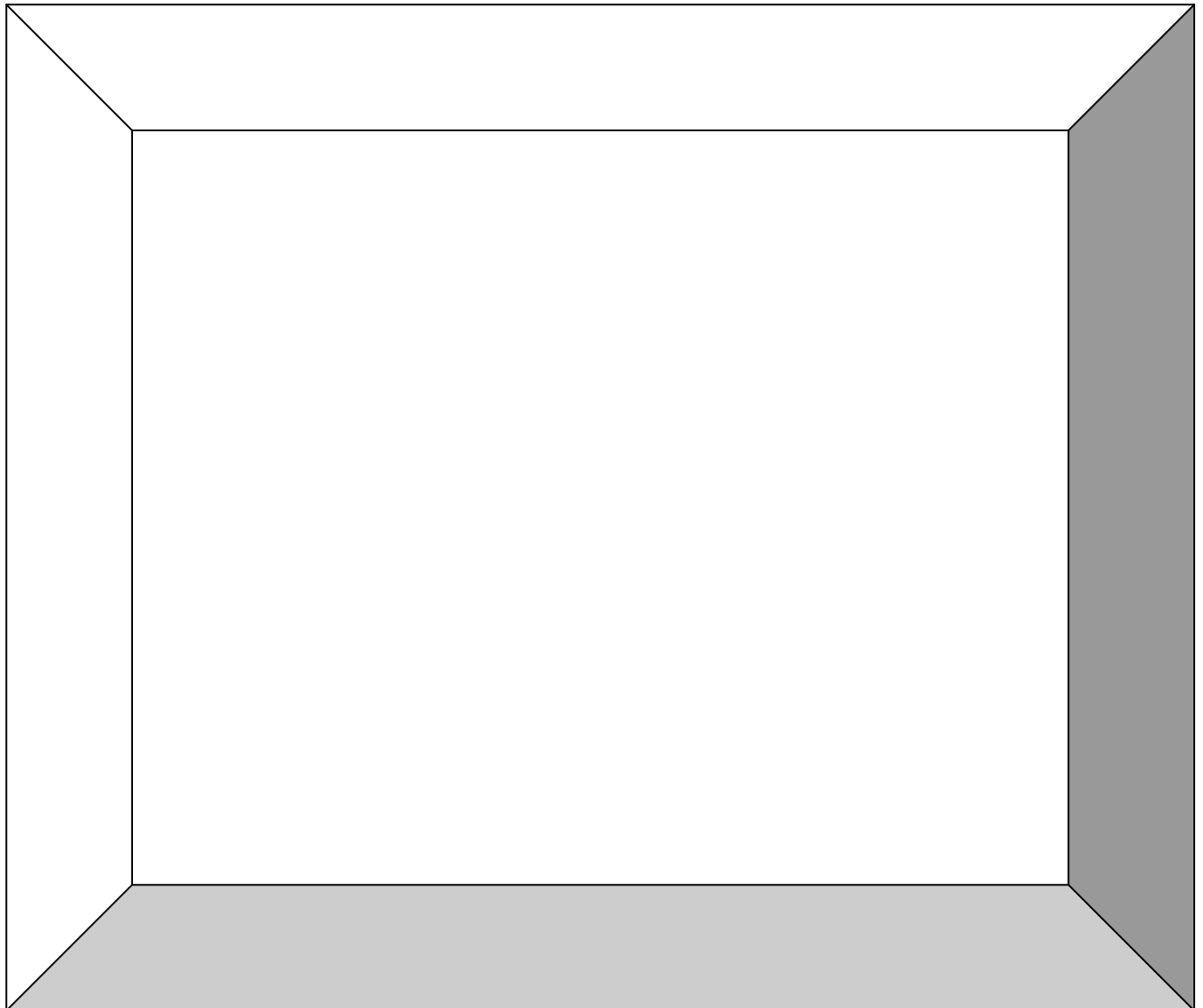


HISTORY WORKBOOK

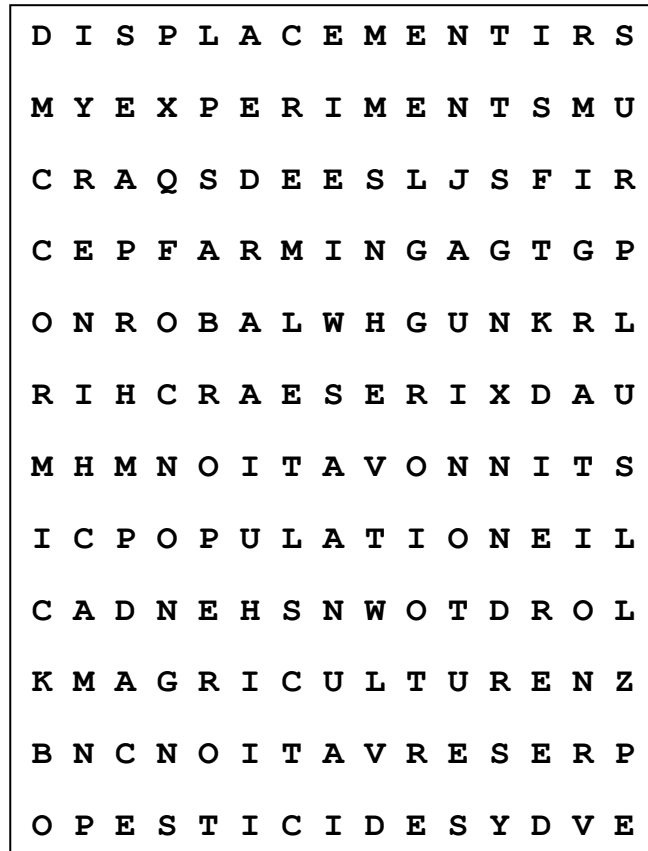
The Agricultural Revolution

European agricultural methods did not change much between the Middle Ages and the 17th century. The tools used were the hoe, plow, and sickle. Farmers used the three-field system, where one-third of the land was left fallow (unplanted) each year in order to restore fertility to the soil. Additionally, the open-field system left farms unfenced, with few improvements made to the land. These farming practices left no significant surplus; only enough food was made to feed the existing population.

Draw a picture illustrating the three-field system.



Word Search Puzzle



agriculture
displacement
engine
experiments
farming
innovation
labor
land
Lord Townshend
machinery
McCormick
migration
pesticides
population
preservation
research
seeds
surplus

Agriculture and Industry

The Industrial Revolution brought machinery to farms. The use of agricultural machinery meant that fewer farm workers were needed. Displaced farm workers moved to the cities, where they found work in factories, sometimes building the very machinery that had replaced them back on the farm. This movement of displaced farm laborers to the cities is known as *rural-to-urban migration*.

Growing populations in urban cities required farmers to grow more crops. These populations needed food

to eat. Workers in textile factories needed raw materials, such as cotton.

The Industrial Revolution and the Agricultural Revolution fed the growth of one another. For example, numerous inventions led to increases in crop production, which led to the need for food preservation, which led to new inventions and methods for preserving food (such as refrigeration), which led to the breeding of crops that were better able to withstand preservation, etc.

1. Imagine that you are a displaced farm laborer. How might you adjust to life in a city?

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2. Kathleen Sullivan was born in Dublin, Ireland, in 1860. At sixteen, Kathleen took a job as a domestic worker. In 1878, at the age of eighteen, Kathleen decided to move to New York to find work in a garment factory. Is Kathleen a rural-to-urban migrant? Why or why not?

Agricultural Innovations

Like the Industrial Revolution, the Agricultural Revolution started in England.

Englishman Jethro Tull invented the seed drill, which planted seeds in straight rows as opposed to scattering the seeds over a field. Tull also introduced horse-drawn

cultivation, which loosened the soil and eliminated weeds.

Another Englishman, Lord Townshend, began the process of crop rotation. This ended the three-field system by illustrating how planting different crops in the same field each year kept the soil from becoming exhausted just as well as leaving each field fallow every third year.

Robert Bakewell, yet another agriculturalist of England, introduced the practice of stock breeding. Bakewell was the first person to scientifically breed farm animals for increased production, and for better quality, of beef, milk, wool, and the like.

Complete the following chart using the information you learned in the section above.

Innovator	Innovation	What It Did

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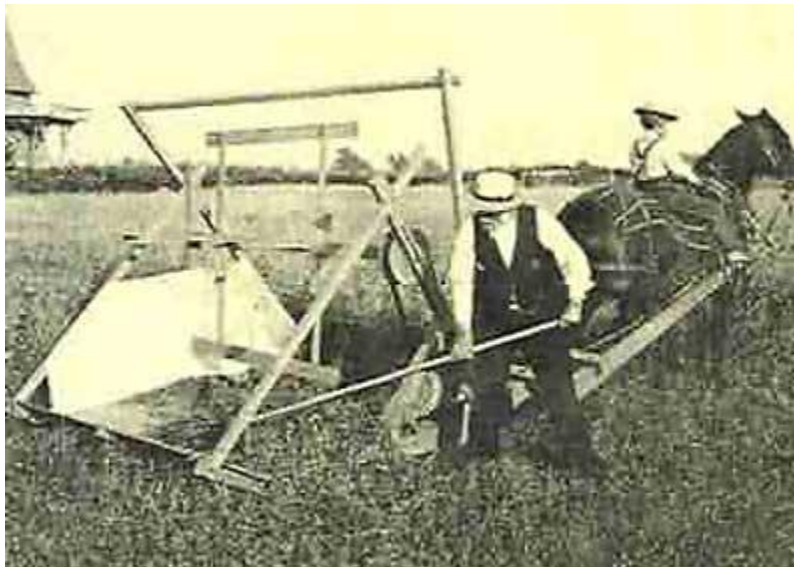
Agricultural Machinery

The cotton gin, invented by American Eli Whitney in 1793, increased cotton production. Cyrus McCormick's mechanical reaper (1834) increased wheat production. Other important early inventions included the horse-drawn hay rake, threshing machine, and steel plow.

Steam engines, gasoline diesel engines, and electric motors were added to farm machinery as they were invented. Again, the Industrial Revolution and the Agricultural Revolution complemented one another. Developments and needs in

one created developments and needs in the other.

3. Based on your knowledge of American and global history, why do you think that the cotton gin was invented by an American rather than by a Briton?



Look at the photograph of a McCormick mechanical reaper to the left. Notice the child on the horse. During this period, the use of child labor was very common. Do you believe that it is alright for young children to work on farms? What about in factories or mines? Explain your answer.

Agricultural Science

Agriculture became a science during the Agricultural Revolution. Farmers and governments invested in agricultural research. Agricultural schools, societies, and experimental stations were established.

The progress made in furthering agricultural science was immense. Strides were made in creating

pesticides (chemicals that ward off bugs and vermin), stock breeding, new foods, food preservation, new farming techniques, improved irrigation methods, and the development of frozen foods.

Today, in the industrialized world, much more food is grown by far fewer farmers than was grown 200 years ago (or than is grown today in the non-industrialized world).

4. Examine the foods you eat each day. How many contain preservatives? Are any items canned or frozen? Compare and contrast the foods you eat each day with the foods eaten before the Agricultural Revolution.

5. The Agricultural Revolution began in England in the mid-1700s and lasted, in the Western world, until the early 1900s—a span of nearly two hundred years. Yet the Agricultural Revolution is only beginning to reach other parts of the world. Why do you imagine this is?

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Matching Questions

6. ____ Agricultural writer who popularized new farming methods
7. ____ American who invented the cotton gin
8. ____ Chemicals used to remove insects and animals from growing crops
9. ____ First to use stock breeding
10. ____ Introduced crop rotation
11. ____ Invented the seed drill and pioneered horse-drawn cultivation
12. ____ Inventor of the mechanical reaper
13. ____ Machine that plants seeds in straight rows
14. ____ Medieval farming practice wherein farmers left one-third of the land fallow each year
15. ____ More than is needed
16. ____ Movement of displaced agricultural laborers from farms to cities
17. ____ Pioneered the use of fertilizers to replenish exhausted soil
18. ____ Science of keeping food fresh long after it would naturally spoil
19. ____ These needed a large, steady supply of cotton in order to operate

Matching Terms

- | | |
|-----------------------|------------------------------|
| (A) Arthur Young | (H) preservation |
| (B) Cyrus McCormick | (I) Robert Bakewell |
| (C) Eli Whitney | (J) rural-to-urban migration |
| (D) Jethro Tull | (K) seed drill |
| (E) Justus von Liebig | (L) surplus |
| (F) Lord Townshend | (M) textile factories |
| (G) pesticides | (N) three-field system |

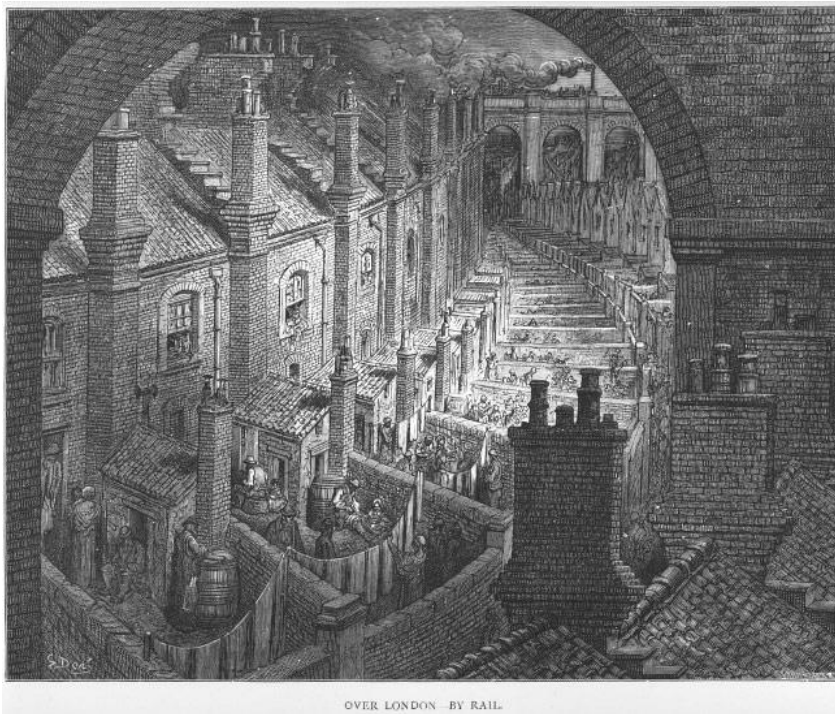
Review Questions

20. Why was agriculture important to textile (cloth or fabric) production?

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24. Weigh the pros and cons of modern agriculture's use of pesticides, preservation, and stock breeding.

The First and Second Industrial Revolutions



The First, or old, Industrial Revolution took place between about 1750 and 1870. It took place in England (Great Britain), the United States, Belgium, and France. The First Industrial Revolution saw fundamental changes in agriculture, the development of factories, and rural-to-urban migration.

The Second Industrial Revolution took place between about 1870 and around the time of World War II. It saw the spread of industrialization to places such as Germany, Japan, and Russia. During the Second Industrial Revolution, electricity became the primary source of power for factories, farms, and homes. There was mass production, particularly of consumer goods.

The use of electrical power saw home electronics enter the marketplace—electric lights and lamps, radios, fans, vacuum cleaners, and more. Modern conveniences, from washing machines to automobiles, became must-have items. Mass consumerism became the norm in the industrialized world.

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25. Examine the impact on modern conveniences on your life. List and describe five electronic devices that you use every day.

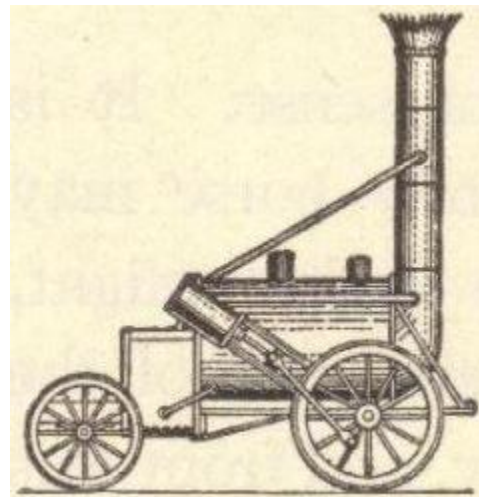
Spread of the Industrial Revolution

In the 1800s, Great Britain, the world leader in the Industrial Revolution, attempted to ban the export of its methods and technologies, but this soon failed. The United States began to industrialize following the War of 1812. Around 1825, following the French Revolution and Napoleonic wars, France joined the Industrial Revolution. By 1870, Germany was industrializing at a rapid pace, while Belgium (early to industrialize), Holland, Italy, Sweden, and Switzerland industrialized more slowly. Russia and Japan were industrializing by around 1900.

Transportation

Advances in transportation—railroads, steamships and canals, automobiles, and airplanes—played a

crucial role in the Industrial Revolution. These modes of transport could not have been built without industrialization. At the same time, the ability to quickly and inexpensively ship goods to market sped up and increased the production of goods.



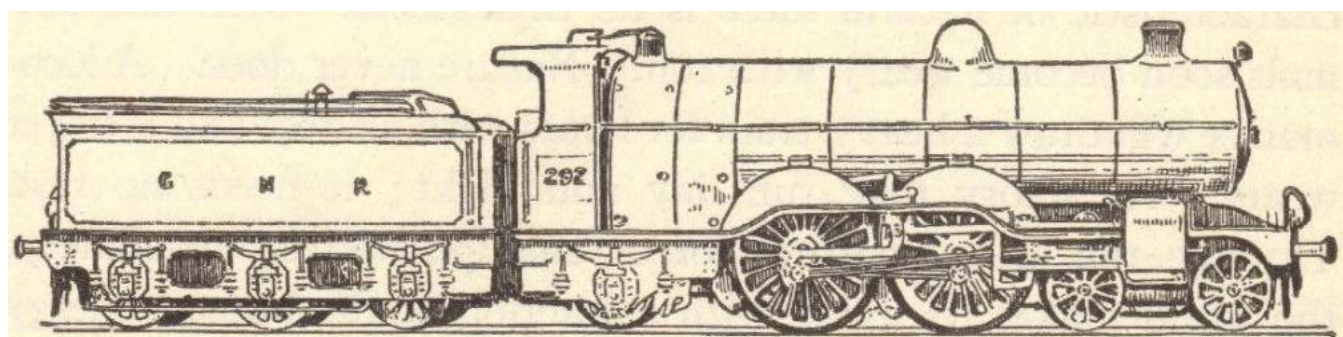
Stephenson's Rocket.

The first locomotive (train) was Stephenson's *Rocket*, built by Robert Stephenson and Company in 1829. It

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was a four-wheel engine supported on springs, with a boiler six feet long. The *Rocket* weighed four and a quarter tons, and on its first run on the Liverpool-to-Manchester Railway, it made an average speed of fifteen miles an hour. This may not seem

impressive by today's standards, but even a modern person can recognize that a consistent fifteen miles per hour over a long distance, combined with heavy toting capacity, is much faster and more efficient than a cart using horse-drawn power.



By the time of World War I, railroad tracks with trains like this covered the globe.

Industrialized nations first laid railroad track in their own countries, then in their colonies and other areas under their political influence. Russia built the Trans-Siberian Railroad between 1891 and 1905, providing the country with fairly easy access to the Pacific port city of Vladivostok. Germany worked to build the Berlin-to-Baghdad Railroad, running across Europe and through the Middle East. Great Britain attempted the Cape-to-Cairo Railroad, built vertically (north to south) across the African continent.

26. Russian port city in the east:
- Moscow
 - St. Petersburg
 - Vladivostok
 - Volgograd

Canals are human-made rivers. The first canals were narrow channels. Typically, horses or mules walked alongside these early canals pulling barges on the water. By the late 19th century, canals were much more impressive, and were designed to allow massive steamships to travel from one large body of water to another.

The Suez Canal (1869) was cut through northeastern Egypt, and provided access to the Indian Ocean from the Mediterranean Sea without the need to sail around Africa. The Kiel Canal (1896) connected the North Sea and the Baltic Sea. The Panama Canal (1914) cut through the narrow strip of land connecting North America and South America, allowing

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ships to travel between the Pacific Ocean and Atlantic Ocean without the need to sail around the southern tip of South America.

Complete the chart below based on the information above.

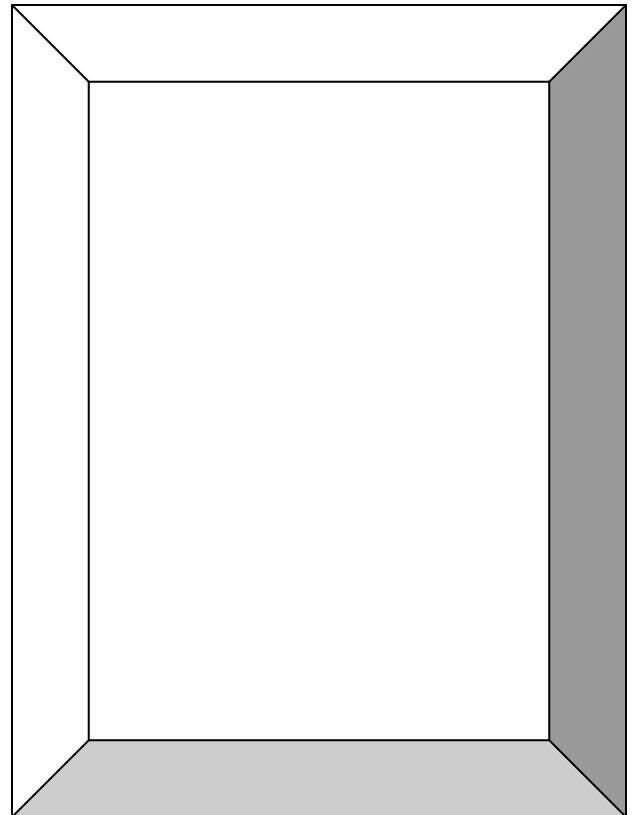
Name of Canal	What It Connects

Automobiles changed both transportation and social systems around the world. In 1839, Charles Goodyear vulcanized rubber, making it possible to create sturdy tires. Gottlieb Daimler designed the first gasoline engine in 1885. At the turn of the last century, automobiles were all the rage, but confined to the wealthier classes. This changed between 1908 and 1915, when Henry Ford of Michigan began implementing the first automobile assembly lines. Copied from a concept he had seen used in meat rendering plants, Ford's assembly line used a conveyor belt that brought the work to the worker, rather than the worker to the work. Ford was able to create cars much

more quickly and less expensively than his competitors, and his Model T was priced low enough that it could be afforded by the middle and working classes.

The first successful airplane was designed by Orville and Wilbur Wright, two bicycle manufacturers from Dayton, Ohio. Their first successful flight was at Kitty Hawk, North Carolina, in 1903. Once flight proved possible, airplane innovation moved quickly. By 1927, aviation pioneer Charles Lindbergh was making the first non-stop flight across the Atlantic Ocean. The mid-20th century saw massive growth in commercial aviation.

Illustrate an assembly line.



Matching Questions

27. ____ Became the primary source of power during the Second Industrial Revolution
28. ____ Began industrializing after the War of 1812
29. ____ Birthplace of the Industrial Revolution
30. ____ Canal in Egypt
31. ____ Connects the Atlantic Ocean and the Pacific Ocean
32. ____ Connects the North Sea and the Baltic Sea
33. ____ Developed the automobile assembly line
34. ____ First successful airplane flight
35. ____ First successful locomotive
36. ____ Human-made waterways
37. ____ Invented the gasoline engine in 1885
38. ____ Made the first non-stop flight across the Atlantic
39. ____ Russian port city on its east coast
40. ____ Vulcanized rubber in 1839

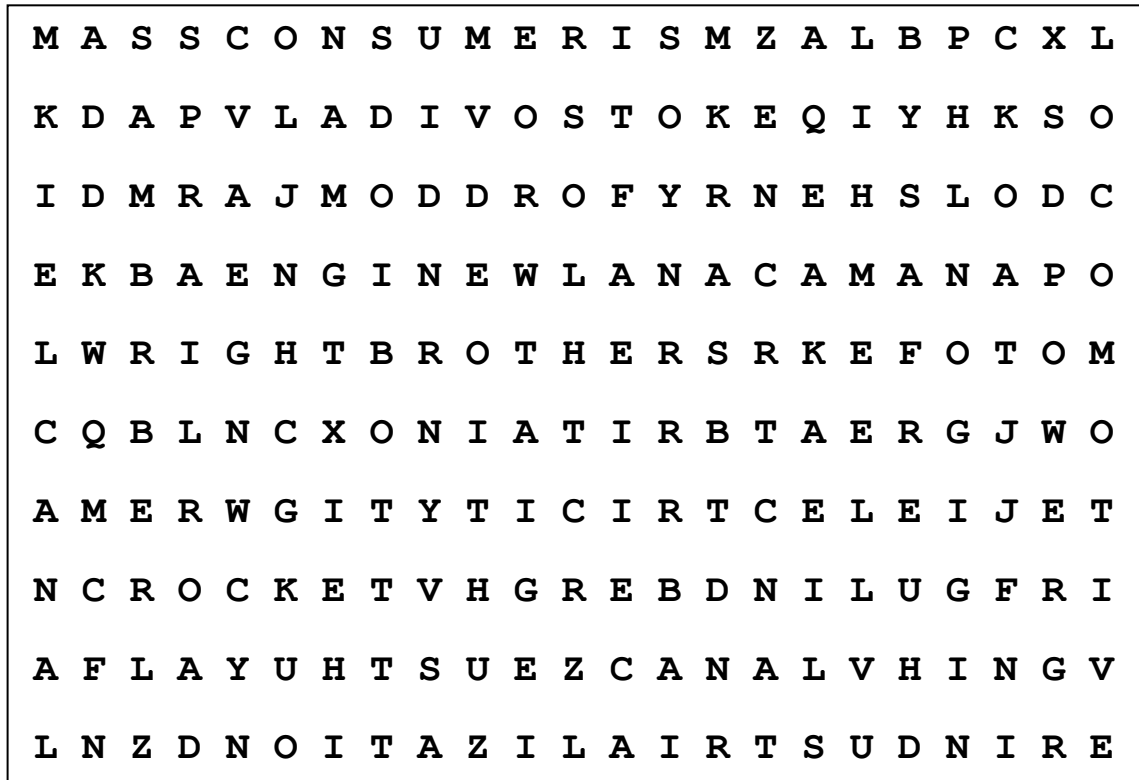
Matching Answers

- | | |
|-----------------------|-------------------------------|
| (A) canals | (H) Kiel Canal |
| (B) Charles Goodyear | (I) Orville and Wilbur Wright |
| (C) Charles Lindbergh | (J) Panama Canal |
| (D) electricity | (K) <i>Rocket</i> |
| (E) Gottlieb Daimler | (L) Suez Canal |
| (F) Great Britain | (M) United States |
| (G) Henry Ford | (N) Vladivostok |

Review Questions

41. Compare and contrast the First and Second Industrial Revolutions.

Word Search Puzzle



electricity
engine
Great Britain
Henry Ford
industrialization
Kiel Canal
Lindbergh
locomotive

mass consumerism
Panama Canal
power
railroad
Rocket
Suez Canal
Vladivostok
Wright brothers



This photograph features the terminal of the Trans-Siberian Railroad in Vladivostok, Russia, photographed circa 1920. Russia had for centuries sought adequate ports. The railway through Siberia gave Russia an efficient means of transporting goods to and from the Pacific Ocean.