The Industrial Revolution and technology

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Image 1. The Winter Cumbrian Mountain Express, hauled by steam locomotive No. 45690 Leander, crosses the Ribblehead Viaduct in North Yorkshire, England. The steam engine was a crucial development of the Industrial Revolution. Photo: Peter Byrne/PA Images via Getty Images

The Industrial Revolution (1750–1850) brought some of the biggest and fastest changes in human history. It began in Great Britain and then spread to other European countries and the United States. Many new tools and machines were first introduced during this period. People’s everyday lives were greatly transformed. Below are some key examples of the major shifts seen during these years.

**Agriculture**

Eighteenth-century Britain experienced a major increase in agricultural productivity. Farms grew larger and produced more crops than ever before. New types of equipment, such as the seed drill, were partly responsible for this increased productivity. Progress was also made in land use, soil health, and animal farming. New kinds of crops were developed as well. The result of all this was a huge increase in output. In turn, far bigger harvests led to a quickly growing population.
Farming during these years became much more large-scale. Land that once had been open to all became private property. Poorer peasants had a harder time making ends meet through traditional farming. Many were forced to move to the cities to become industrial workers.

**Energy**

By the 1500s, England had begun to lose many of its forests. This led to a shortage of wood for fuel. Coal then became a major alternative energy source. The country’s move to coal was complete by the end of the 1600s. The coal-fired steam engine soon became the key technology of the Industrial Revolution.

Water power was widely used as a source of energy in pre-industrial Europe. By the late 1700s, however, steam engines had been perfected. Steam power soon replaced water power.

The steam engine swiftly became the key power supply for British, and later, European industry. It powered factory work. It also freed manufacturers from the need to locate their factories near sources of water power. Large factories began to cluster together in quickly growing industrial cities.

**Metallurgy**

Many valuable metals can be found in the metal-bearing rock known as ore. Metallurgy is the process of extracting, or removing, that metal through heating and melting, or smelting. Metal that has been heated to the melting point is called molten. Metallurgy also involves the shaping of extracted metal.

Metallurgy had existed for thousands of years. However, it too saw big changes during the Industrial Revolution. Britain's wood shortage forced a switch from wood to coal in the smelting process. The new fuel turned out to be highly useful for iron production.

Experimentation led to some other advances during the 1700s. For example, a new process of "puddling" or stirring molten iron made it possible to produce larger amounts of wrought iron. Wrought iron is more malleable, or moldable than cast iron. It is thus better for making machinery and other industrial uses.

**Textiles**

The production of textiles was key to Britain's economic growth between 1750 and 1850. Cotton was the most important of these fabrics. Cotton production had long been a small-scale cottage industry. People living in small villages wove and spun cloth in their homes. During the years of the Industrial Revolution, cotton production turned into a large, factory-based industry. Machines took over much of the work previously done by people.

Several new inventions greatly increased productivity in the textile industry. Among them were the spinning jenny, the spinning mule, the cotton gin and the power loom. The introduction of steam
power also transformed the production of textiles. Steam power was used to operate power looms and other equipment.

**Chemicals**

The chemical industry developed very quickly during the years of the Industrial Revolution. It arose partly to meet the demand for improved bleaches. These were used to whiten cotton and other textiles. Other chemical research was motivated by the need for dyes, dissolving agents, fertilizers, medicines and explosives.

**Transportation**

Huge increases in the production of goods led to a need for better transportation systems. Producers needed faster ways to get their goods to market. As a result, improved roads were constructed. Canals were dug to connect existing waterways.

The first steamboats appeared in the early 1800s. Steam engines also powered railroad locomotives, which began running in Britain after 1825. Railways quickly spread across Europe and North America. They helped to expand the frontiers of industrial society.
Quiz

1. Read the section "Agriculture."
   Select the sentence from the section that shows an effect of producing more crops during the Industrial Revolution.
   (A) Eighteenth-century Britain experienced a major increase in agricultural productivity.
   (B) Farms grew larger and produced more crops than ever before.
   (C) In turn, far bigger harvests led to a quickly growing population.
   (D) Poorer peasants had a harder time making ends meet through traditional farming.

2. Read the section "Textiles."
   Which sentence from this section supports the conclusion that cotton production during the Industrial Revolution changed?
   (A) Cotton was the most important of these fabrics.
   (B) Cotton production had long been a small-scale cottage industry.
   (C) People living in small villages wove and spun cloth in their homes.
   (D) Machines took over much of the work previously done by people.

3. How is the overall structure of the section "Agriculture" similar to the overall structure of the section "Transportation"?
   (A) Chronology is the overall structure of both sections.
   (B) Problem and solution is the overall structure of both sections.
   (C) Cause and effect is the overall structure of both sections.
   (D) Comparison is the overall structure of both sections.

4. If the section "Metallurgy" were organized chronologically, which sentence would come FIRST?
   (A) Metal that has been heated to the melting point is called molten.
   (B) Metallurgy had existed for thousands of years.
   (C) The new fuel turned out to be highly useful for iron production.
   (D) Experimentation led to some other advances during the 1700s.