

Teachers' Notes

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THE INDUSTRIAL REVOLUTION

TEACHERS' NOTES

The Industrial Revolution

Chapters

Introduction

Demand for Textiles

From Hand Loom to Power Loom

From Water Power to Steam Engine

Factories and Infrastructure

Living and Working Conditions

Introduction

This video film on the Industrial Revolution examines how life and civilisation were transformed by the great changes in industry, technology and science.

It looks at how production by hand changed to production by machines and examines the change from the domestic system to the factory system, where goods were made by groups of workers in factories. It gives an insight into the new working and living conditions and also deals with the development of the means of communication, roads, railways and canals.

Accompanying the Industrial Revolution was the improvement and mechanisation of agriculture.

The Domestic System

The main occupation of the British people in the eighteenth century was agriculture. Apart from farming, the largest industry in Britain was the manufacture of textiles, such as woolen cloth, linen, silk and cotton. In the earlier part of this century there were no factories and goods were made by hand in the homes of the workers. They worked long hours, earned low wages and at times did not have enough work. The domestic system survived for many years in the woolen industry and a complete factory system was not established until the 1870s, partly because workers were opposed to machines which might mean that fewer people were employed. The widespread use of John Kay's *Flying Shuttle* helped speed up handloom weaving from the 1760s, requiring more spun yarn to supply the weavers. The first successful spinning machine, the *Spinning Jenny* built by James Hargraves in 1770, fitted easily into the domestic system and increased the output of the spinner dramatically.

Issues and Activities

1. What were the advantages and disadvantages for people working in home workshops?
2. Describe some of the earlier simple machines used in the manufacture of textiles in the cottage industry. How did they compare with the Flying Shuttle and the Spinning Jenny?
3. Outline the role of cloth merchants in the eighteenth century.
4. Why was there such a demand for textiles in Britain and the world?

5. Research: Why did cotton replace wool? Where did the cotton come from? What impact did the need for cotton have on the slave trade?
6. Discussion: Was the Industrial Revolution more of an evolution than a revolution?

The Factory System

Richard Arkwright's *Water Frame* used water power to produce yarn in 1769. Two years later Arkwright set up a water-driven factory at Crompton, which employed 300 people. Entrepreneurs built factories in other parts of the Midlands and in Lancashire, taking advantage of the fast flowing waterways to power their factories.

In 1779, Samuel Crompton invented the *Mule*. It needed high quality yarn but needed skilled labour to work it. As a result factories were built in towns where skilled labour was available.

Progress in weaving machinery was not as advanced as in spinning, and weavers could not produce at the required rate. In 1785 Edmund Cartwright invented a power-driven loom, but it was not until the 1820s that the power loom was of suitable quality to replace the handloom. Thus manual work at home was replaced by machine work in a factory.

In 1781 James Watt made the rotary steam engine, which could turn a wheel and so drive machinery. After 1785 steam gradually replaced water power in spinning mills. The use of steam power meant that factories were often built near coalfields.

Issues and Activities

1. From the video, what type of location was Samuel Greg looking for his textile factory?
2. List the inventions mentioned in the video, which helped to bring about the factory system.
3. List some modern examples of technology which have caused unemployment.
4. Describe the ways in which the textile revolution changed the lives of domestic workers in the textile industry.
5. What were the advantages of steam power over water power?
6. Discussion: Why was Britain often referred to as the workshop of the world?

Working Conditions

Although wages were usually higher in factories than under the domestic system, people had to work longer hours under strict conditions. Factory owners wanted to minimise costs and maximise profits. Factories were poorly ventilated and extremely noisy with all the machinery. Equipment was often dangerous to use, with few safety devices, resulting in many accidents. Working conditions were particularly unpleasant in the textile industry because for the best processing results, a temperature of 30 degrees Celsius and high humidity were necessary. Dust and cotton fluff also contributed to these poor conditions. For a family to survive, it was necessary for women and children to work in

factories for minimum wages. While women were often poorly treated by overseers the working conditions of children were often appalling. Children, who made up half the work force, worked up to 15 hours each day and were often required to maintain dangerous equipment. While reformers such as Robert Owen and Sir Robert Peel promoted Acts of Parliament to protect children, these acts were generally not put into practice and many factory owners continued to make their employees work long hours.

Lord Shaftesbury, another reformer, also devoted much effort to improving the living and working conditions of children.

Inspectors were appointed to see that factory owners did not break the new rules and by 1850 a ten hour working day had been achieved for all workers in textile factories.

Working conditions in mines were even more hazardous and many lives were lost underground. Mines had very few safety features and it was not until 1815 that Sir Humphry Davy invented a safety lamp. A report published in 1842, showing women and children working in poor conditions underground, shocked the public. Again, partly through the efforts of Lord Shaftesbury, a Mines Act was passed which banned the employment of women and young children underground.

Issues and Activities

1. Using the material from the video film, write a report on working conditions in a textile factory during the Industrial Revolution.
2. Why was it possible to make cotton garments so cheaply?
3. Describe a day in the life of a child in a textile factory.
4. With such poor wages, why were people prepared to work in the sweatshops?
5. Research: What role did trade unions play in gaining better conditions for workers?
6. Discussion: Were workers in the Industrial Revolution merely cogs in a machine?

Living Conditions in the Towns

Before the Industrial Revolution towns were small. After the mid eighteenth century many people left the countryside for the towns, ports and industrial communities on the coalfields of the Midlands, the North, and South Wales. They were attracted by higher wages and the opportunity of employment.

Manchester, Leeds and Bradford grew rapidly in size.

When a mill owner or a mine owner decided to develop his enterprise, houses had to be built for the workers near the workplace. There was no law which laid down standards for housing or the width of streets. Many workers lived in rows of back-to-back houses, without proper ventilation and lighting. Builders of these developing towns had little experience in dealing with the problems of refuse disposal, sanitation or supplying a large number of people with an adequate and clean water supply.

The individual house builder never felt it necessary to provide these working class houses with either a water supply or a sanitary system. To have done so would have put up the costs and have caused overcrowding, as the number of families per house would need to be increased.

There was no provision for paved streets. House refuse was thrown on to these muddy streets, and they became another potential source of disease as the refuse rotted. There was no organised street cleaning. It is therefore hardly surprising that the death rate was very high as disease flourished.

Issues and Activities

1. Why did workers have to live near factories and coal mines? Where did the wealthier people live? What was the difference in the quality of their housing?
2. What do you think was the greatest fear of people living in these new industrial towns?
3. Research: How would one of these new towns compare with a new housing estate today?
4. Research: Why did thousands of people leave rural areas to work in the cities?
5. Discussion: Did the Industrial Revolution change the lives of the working class for better or for worse?

Development of Transportation and Communication

If an increasing amount of coal, iron, cotton, food and other goods were to be carried to and from Britain's growing industrial towns, then there would have to be an improvement in the method of transport.

The Canal Age

Merchants and manufacturers in Britain invested money in this form of transport. Canals were particularly useful for the carrying of heavy or bulky loads. The first canal in England, the Sankey Brook canal was constructed in 1757 to open up the St Helens coalfield. By 1850 Britain had nearly 7000 kilometers of waterways. Industrial regions such as Birmingham, benefited greatly from the canal network.

Road Transport

To repair and improve the quality of roads, companies known as turnpike trusts, put up toll gates. The main roads to London were the first to be turnpikes and by the 1830s turnpike trusts controlled about 35,000 kilometers of road. Two Scottish engineers, Thomas Telford and John McAdam, refined the art of road building. Road improvements and the construction of iron bridges led to more reliable coach and postal services and to decreases in the cost of freight.

Railways

The earliest railways were built on the coalfields and were pulled by horses. In 1767 Richard Reynolds built a cast iron track from Coalbrookdale to the River Severn. Wrought iron tracks began to be used in the early nineteenth century.

Many experiments took place in steam locomotion. Richard Trevithick built the first locomotive to run on rails to carry coal and iron. A further development came when William Hedley built the *Puffing Billy*. George Stephenson drove the engine *Locomotion I* at the opening of the Stockton and Darlington railway. His work as an engineer on the Liverpool and Manchester railway was even more important, with his *Rocket* chosen as the best locomotive.

Railways were often opposed by turnpike trusts, coach and canal operators. Landowners sometimes objected to railways near their properties. Some towns such as Northampton refused to be on the railway line. The problem of different railway gauges was settled in 1846 when Stephenson's narrow gauge was accepted as the standard.

Railways further reduced transport costs and provided cheaper passenger travel. Many new towns grew up as a result of the railways.

Issues and Activities

1. Explain some of the difficulties that faced the first canal builders.
2. Investigate the meaning of aqueducts, towpaths and lock-gates.
3. Why was the building of a canal system essential for both the building of new industrial towns and supplying new factories with raw materials?
4. Why were many roads unsuitable for heavy materials and fragile articles? How was this problem largely overcome?
5. Choose the main features of ONE railway system in the early nineteenth century.
6. Make a list of the significant inventions and developments in transportation and communication in the nineteenth century.

The Workshop of the World

Britain was the first country to undergo an Industrial Revolution which later spread throughout Europe. By the middle of the nineteenth century Britain was the leading manufacturing nation in the world, producing one-third of the world's shipping and manufactured goods and one quarter of the world's trade.

Largely as a result of the Industrial Revolution, Britain became a country where most people lived and worked in towns. The changes brought about also enabled Britain to support a growing population.

Industrial change eventually brought about a higher standard of living and improvements in the quality of peoples' lives. The working classes also grew in strength and benefited from the action of trade unions and co-operative movements.

The position of women in society also showed some improvement. Women became more employed in trade and industry and less in agriculture. Over time children were better protected from exploitation. The role of children in factories and mines was regulated and better supervised.

While some improvements were made in areas such as town planning and public health, many of the appalling living and working conditions continued in

the big cities in the nineteenth century.

Britain's new industries were put on show in the Great Exhibition of 1851. In Hyde Park in London, a great Crystal Palace was built. It was nearly 600 meters long and housed more than 7000 exhibitors from both Britain and abroad. More than 6 million visitors came to the exhibition from all parts of the globe. It was a fitting testimony to the progress that Britain had made.