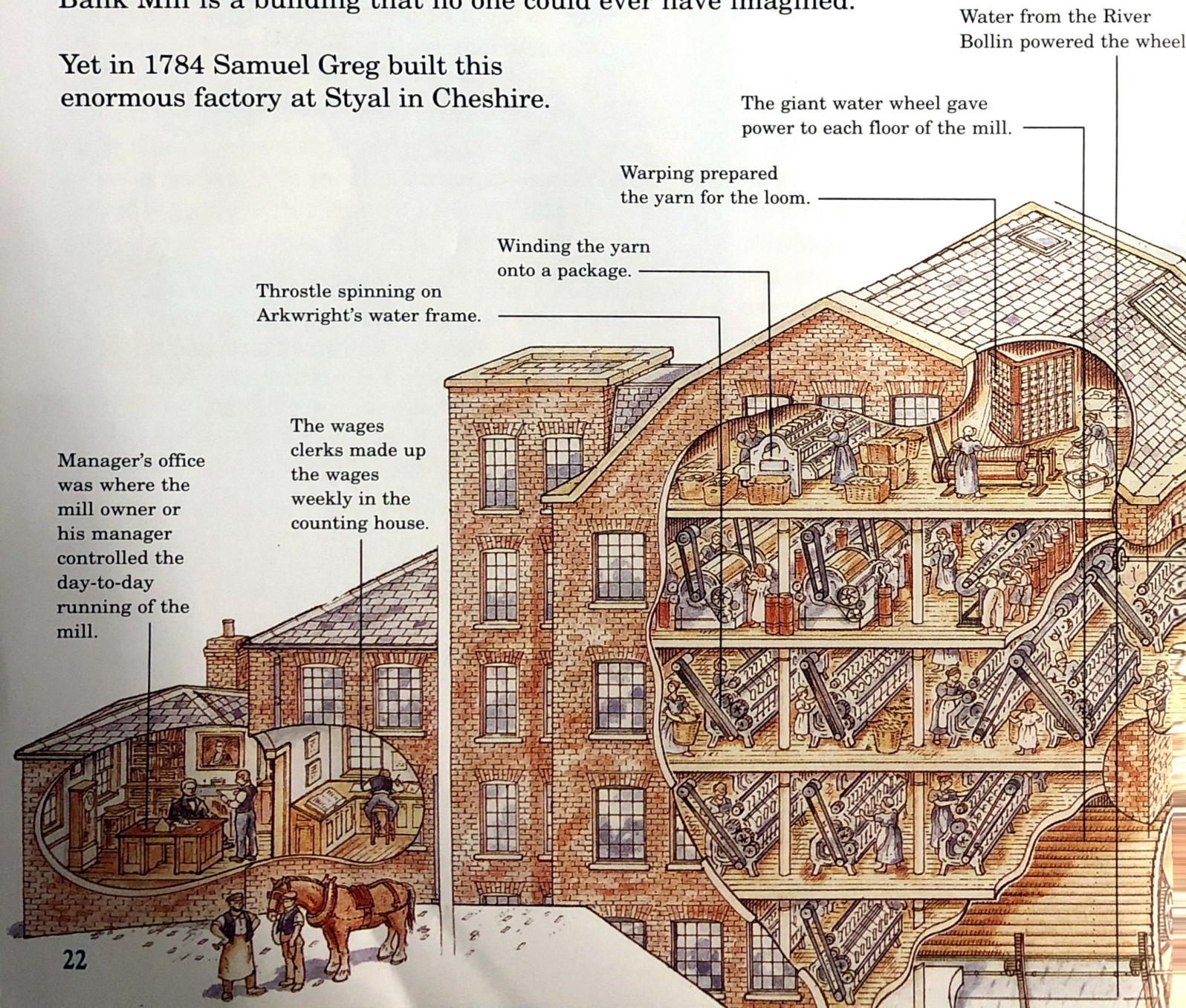
Money, mills and machines 3

Why was Quarry Bank Mill so successful?

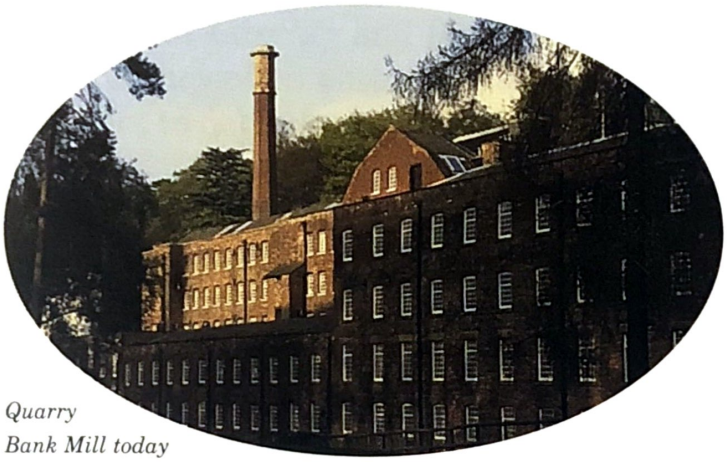
Look carefully at this illustration of the inside of Quarry Bank Mill. A **mill** is a big factory. This is what the mill might have looked like during its heyday in the 1820s and 1830s.

Before the late 18th century no one had ever seen a factory like this! No one would have believed that such things were possible. No one worked like this. No one even expected to work like this. Quarry Bank Mill is a building that no one could ever have imagined.

Yet in 1784 Samuel Greg built this enormous factory at Styal in Cheshire.



The factory made a lot of money and Samuel Greg carried on improving it. After his death, his sons carried on improving it. They made even more money than he did.



Quarry Bank Mill today

Your enquiry

By the end of this enquiry you will be able to answer the question, 'Why was Quarry Bank Mill so successful?' There are lots of ways of explaining things that happened in the past. But which is the best way?

You are going to look at four ways of answering the question. You will soon see that the success story of Quarry Bank Mill was part of some much bigger stories.

Millwrights had to keep the gears and shafts of the water wheel working.

Carding untangled the cotton.

Reeling wound the cotton into hanks for sale.

Drawing stretched the clean fibres and straightened them.

Mule spinning stretched and twisted yarn to make finer thread. Spinning was a man's job assisted by women piercers who mended any broken threads. In some mills children known as scavengers kept the mule clean of dust and loose thread. They had to crawl under the moving machinery.

Bells marked the arrivals, mealtimes, and departures of the workers.

A cut-away reconstruction of Quarry Bank Mill

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Quarry Bank Mill today

Soon see that the success story of Quarry Bank Mill was part of some **much bigger stories.**

Water from the River Bollin powered the wheel.

The giant water wheel gave power to each floor of the mill.

Warping prepared the yarn for the loom.

Winding the yarn onto a package.

Throstle spinning on Arkwright's water frame.

Manager's office was where the mill owner or his manager controlled the day-to-day running of the mill.

The wages clerks made up the wages weekly in the counting house.

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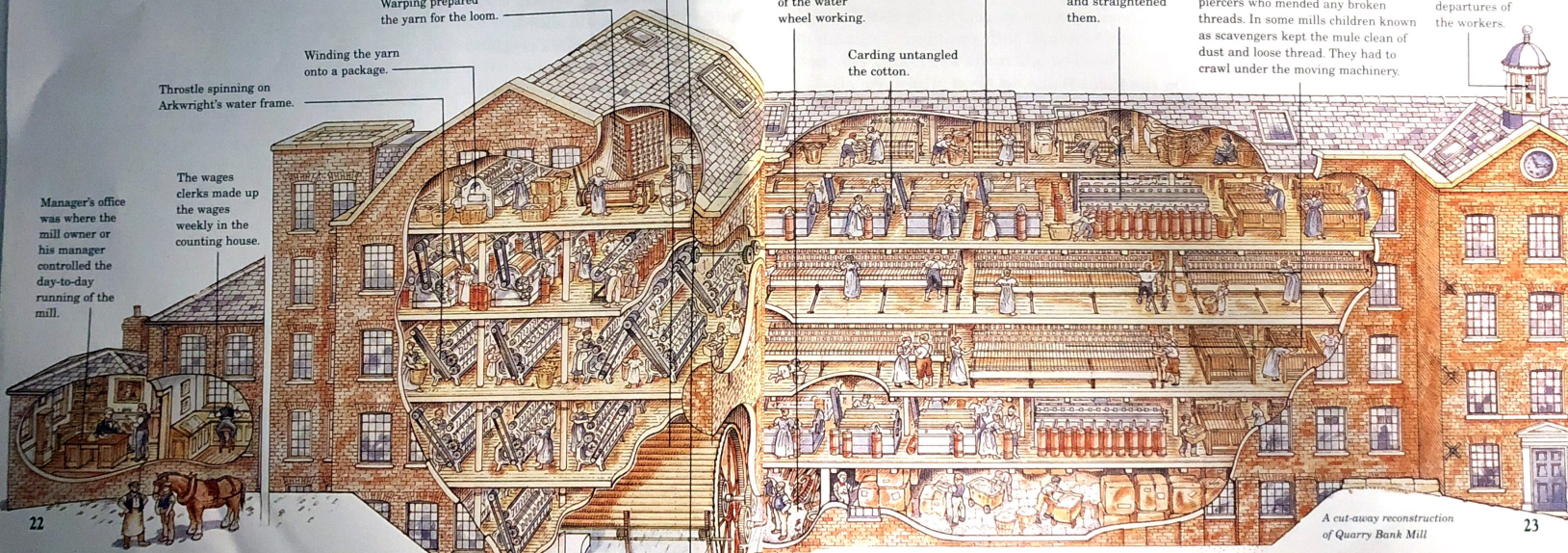


A cut-away reconstruction of Quarry Bank Mill

Explanation 1 – The story of a businessman: Samuel Greg

Samuel Greg came from a very wealthy family of merchants in Belfast. He is marked in red on this family tree.

Samuel Greg

Hannah Lightbody

Think

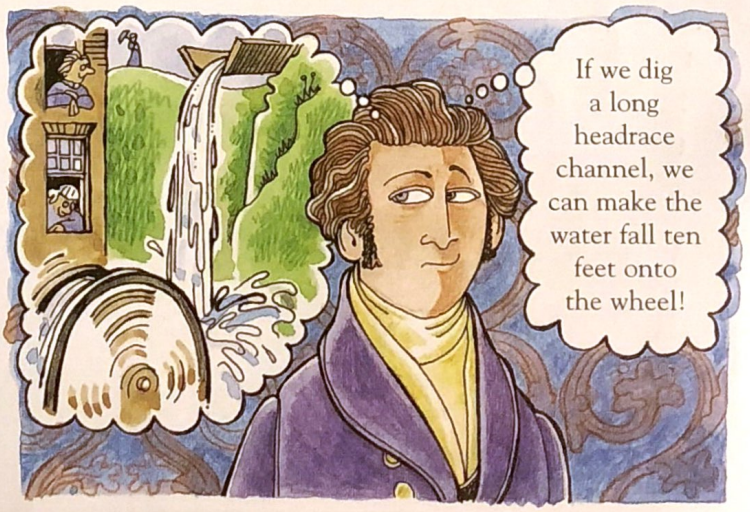
- Find Robert Hyde (Samuel's uncle) on the family tree.
- How old was Samuel Greg when his uncle died in 1782?
- When Samuel Greg died in 1834, who inherited Quarry Bank Mill?

Samuel Greg was adopted by his uncle, Robert Hyde. Robert Hyde lived in Manchester where he already had a successful business as a cloth merchant. Robert Hyde took Samuel into partnership in 1780. On his uncle's death in 1782, Samuel took over the business.

Samuel Greg started to buy property to expand the business. He also decided that he needed to build a very large building in which all his cotton workers could work together. He started to go on long journeys into the countryside around Manchester.

He was looking for a fast-flowing stream. In 1783, he found what he was looking for.

On the River Bollin, at Styal, just north of Wilmslow, he found a place where he could dig a long headrace channel. This meant that there was plenty of water to turn a big wheel very fast. As the wheel turned, it could provide power for all the machines in a mill.



In 1784, Samuel Greg built the first mill at Styal.

Samuel Greg also built a fine house for his family. Samuel and Hannah were well known among other business people and factory owners from Manchester's new middle classes. They were members of the Manchester Literary and Philosophical Society. They often entertained the visiting speakers to debates at their fine home.

Samuel Greg was also a religious man. Like some other successful business men in Manchester he was not a member of the Church of England. He was a **non-conformist**. He and his wife went to a **Unitarian** church. At the Unitarian church each Sunday, he met many other wealthy business people and their families. Some of these people took a great interest in the education of working people.

In the 1780s many factory workers lived in dreadful conditions. But Samuel Greg was very concerned about the welfare of his workers. He built houses for them on his land. He also built an **apprentice** house for the children who worked in the factory.

Samuel Greg provided education and medical care for the children. But the children still worked very long hours in the mill. Their lives were completely different from the lives of Samuel Greg's children.

In 1830, Samuel's son Robert built a grand mansion at Norcliffe Hall. The house was large and beautiful. It was surrounded by woods and fields. By this time, the Greg family owned other mills too.

The Greg family were now wealthy and powerful.

Norcliffe Hall

Samuel Greg died in 1834. He would have been proud of all his achievements.

STEP 1

Telling the story of Samuel Greg is one way of explaining why there was such a successful mill at Styal. Write a heading:

Explanation 1: The story of Samuel Greg

Under the heading, copy and complete this sentence-starter four times, each time using one of the four different sentence-endings that follow.

Quarry Bank Mill was so successful because ...

... Samuel Greg came from a family that was used to finding new ways of making money.

... Samuel Greg was a serious, hard-working, energetic man who was determined to achieve a lot.

... Samuel Greg inherited the family business from his uncle.

... Samuel Greg was clever enough to find a stream where the water could flow fast enough to turn his water wheel.

Now choose one or more code letters to write next to each completed sentence:

M = money **G** = geography
I = the skill and vision of individuals

Samuel's vision, skill and determination were very important, and so was his choice of place for the mill. But all this information about Samuel Greg still does not **really** explain why the mill was so successful. People were building mills in many parts of Britain. They had not done so before. Now it was happening all over the place! We need to ask **bigger** questions. We need to look for more explanations.

Explanation 2 – The story of the new inventions

Something else was happening. Cloth had been made in Britain for centuries, but the work had always been done in small workshops or in people's cottages. This picture shows an Irish family cotton hand-spinning at home, in the 18th century. The spinning wheels were pushed into a corner when the family wanted to eat.

A great change took place in the last quarter of the 18th century. New inventions were changing the way in which cloth was made.

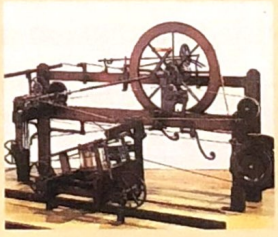
Machines that could be used at home

1733
The flying shuttle
Invented by John Kay
Made weaving much quicker

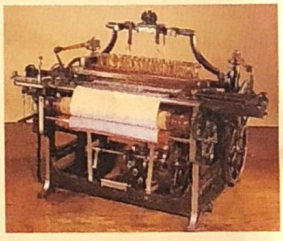
1764
The spinning jenny
Invented by James Hargreaves
Could spin eight yarns at once

Machines that were big and were used in factories

1769
The water frame
Invented by Richard Arkwright
Powered by water. Could only be used in factories. Made much stronger thread



1784
The mule
Invented by Samuel Crompton
Made high-quality, strong thread



1786
The power loom
Invented by Edmund Cartwright
Slowly took over all weaving. Powered by water or steam

When Samuel Greg began to build his mill in 1783, he built it to house spinning frames. These spinning frames were large. The workers needed plenty of light so the factory windows were large. The machines needed power from a water wheel. Samuel Greg was using new technology.

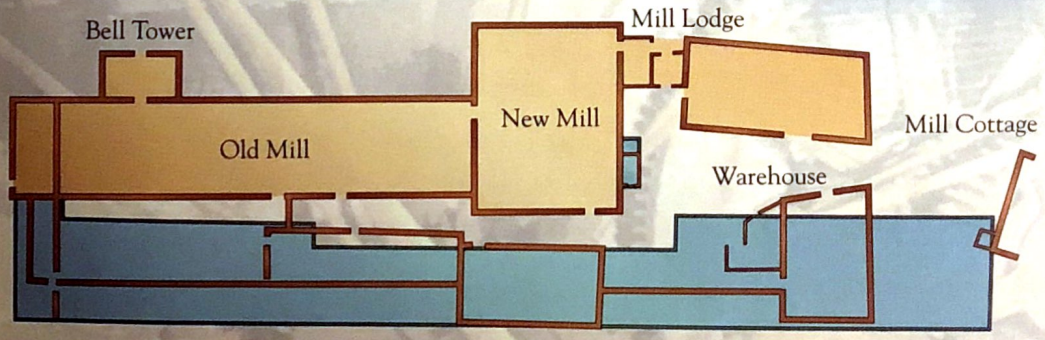
Think

Why did Samuel Greg have to pay attention to:

- **where** he built the mill?
- the **size** of the mill?
- the **shape and features of the rooms** in the mill?

Young Robert Greg was always trying to persuade his father to use even newer technology. The newest power looms for weaving could be powered by water or steam.

Samuel was not sure. It was a big risk. When he died in 1834, he had still not agreed to the change. After his death, his son Robert lost no time. In 1836, alterations were made to the building. Quarry Bank Mill soon had power looms, just like Cartwright's power loom. Now they could weave at Quarry Bank Mill too.



Plan showing when new buildings for weaving were built at Quarry Bank Mill

STEP 2

Telling the story of new inventions is another way of explaining why there was a successful mill at Quarry Bank. Write a heading:

Explanation 2: The story of new inventions

Copy and complete this sentence-starter three times, each time using one of the three different sentence-endings that follow.

Quarry Bank Mill was so successful because ...

... Samuel Greg wanted to use spinning frames as these would spin cotton more quickly and this would make cotton cheaper.
... it was no longer possible to house the new machines in cottages and small workshops.
... it had a strong power source (the fast stream), which is what the new machines needed.

Now write one or more code letters next to each sentence:
T = technological change
M = money **G** = geography
I = the skill and vision of individuals

Think very hard. Some sentences will need more than one code letter.

Explanation 3 – The story of cotton

Something else was happening, too. By the time Robert Greg was putting power looms into his mill at Styal in 1836, cotton had become much more important than wool. Exports of cotton goods were worth only £11,000 a year in the 1740s. This had risen to £17 million by 1820. By 1850, cotton goods were Britain's leading **export**. **But why had cotton become so important?**

Here are four possible reasons.

Reason 1: The population was increasing

The number of people in the British Isles went up from 10.7 million in 1750 to nearly 27.4 million in 1850. **Textile** producers knew they could get rich by producing more. The demand for textiles was growing.

Reason 2: The supply of raw cotton grew

After North America became independent in 1783 the Americans were free to look for new products to sell. Cotton plantations soon became very successful. In 1793 Eli Whitney invented a 'cotton gin' which helped slaves to prepare cotton 50 times faster than before. Imports of cheap raw cotton from the United States of America into Britain grew.

Reason 3: People spent more money in the 18th century

Some of this money was spent on clothes. There was therefore an increase in demand for cotton.

Reason 4: There was a great expansion in trade

Britain was the world's leading trading nation in the late 18th century. British ships carried goods all over the world. By the early 19th century cotton goods made up nearly half of all British exports.

STEP 3

Telling the story of cotton is yet another way of explaining why there was such a successful mill at Styal. Write a heading:

Explanation 3: The story of cotton

Copy and complete this sentence-starter four times, using each of the four different sentence-endings.

Quarry Bank Mill was so successful because ...

... there were more and more people in Britain and they wanted more and more cotton.

... there was more and more cotton available, especially after the Americans started to grow it.

... people in Britain began to spend much more money in the 18th century.

... people abroad were spending more and more money on British goods as Britain expanded her trade all over the world.

Now write one or more code letters next to each sentence:

T = technological change **M** = money

G = geography **I** = the skill and vision of individuals

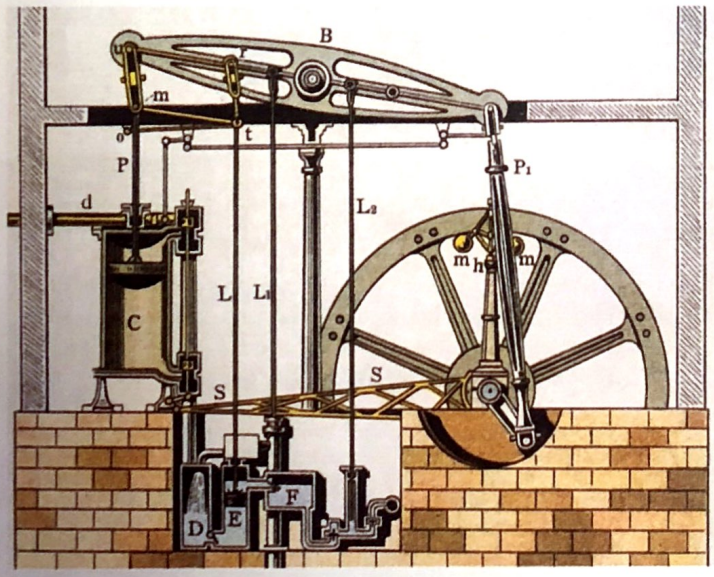
Think very hard! You will need to go back and read the four reasons on this page again. Some of your sentences will have more than one code letter!

Explanation 4 – The story of iron, coal and steam

Meanwhile, yet **another** story was taking place! Without it, the first three stories would not have happened. This is the story of cheaper iron and coal. It is also the story of steam power.

Steam engines use coal to heat water and create steam. The pressure of that steam is used to move a piston. In 1766, a Scottish engineer called James Watt made big improvements in the design of steam engines so that they would be more powerful and burn less coal.

In 1781, Watt found a way of getting a steam engine to turn a wheel.



Watt's double-acting condensing steam engine

Think

- What fuel powered this steam engine?
- What materials do you think were necessary to make this steam engine?
- How would steam engines have helped the Greg family?

Steam engines could now be used in factories instead of water wheels.

This steam engine was made possible because of two big developments.

Development 1: New ways of making iron

In 1709, a man called Abraham Darby found a way of making cast-iron using coke. Coke is made from coal. This was a big breakthrough. Iron had always been made from charcoal. By the 18th century, charcoal was becoming scarce and expensive. In 1784, Henry Cort invented a new method of making wrought-iron in a huge coal-fired furnace. So it became cheaper to make iron. Well-made iron machinery was essential for the machinery used in the factories.

Big idea: iron makes coal more important!

Development 2: A new role for coal

The new factories depended on coal. It was coal that fuelled the steam engines and the iron foundries.

Big idea: coal makes iron more important!