

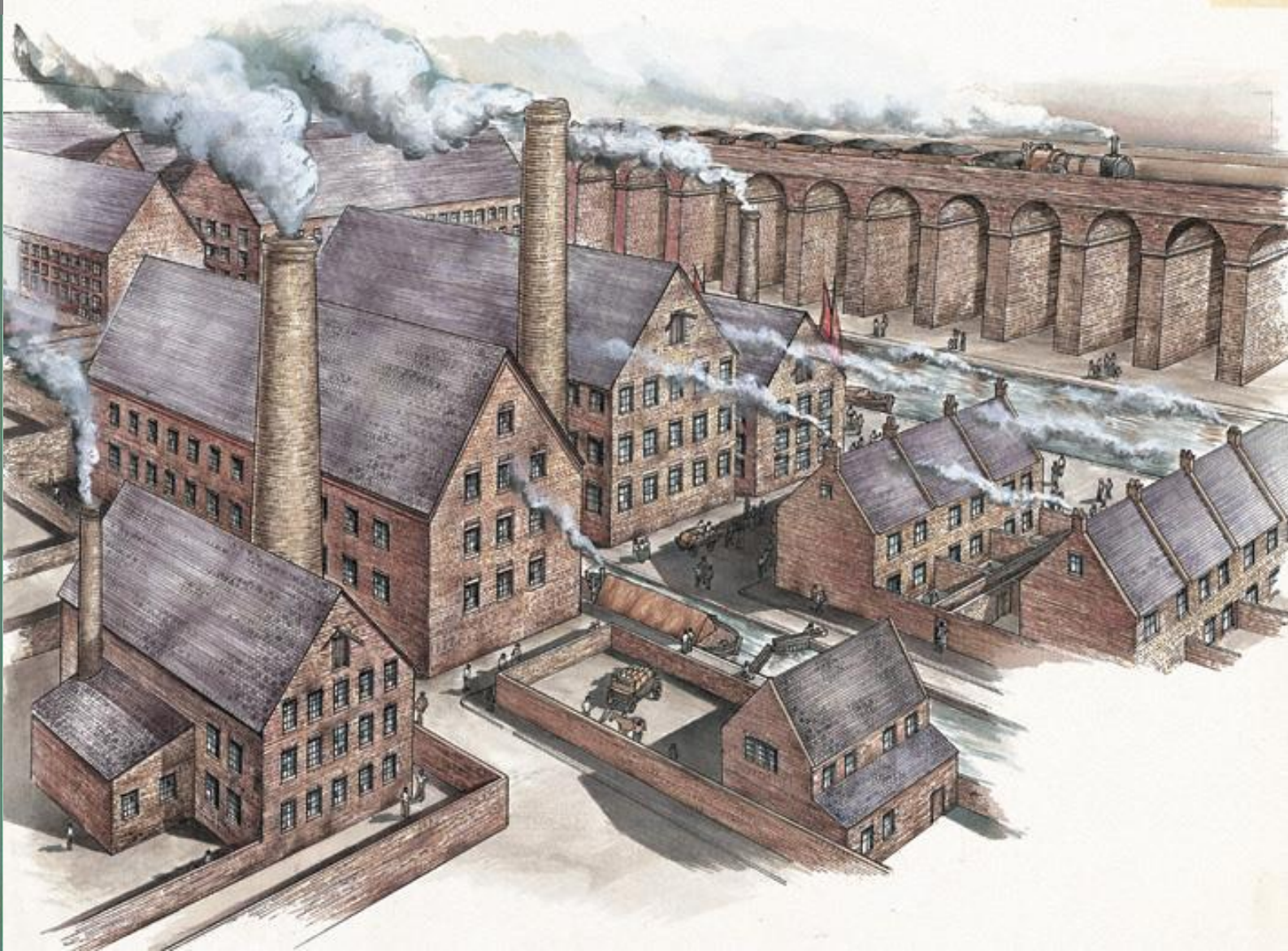
The Industrial Revolution


Learning Goal 1: Describe the causes of industrialization and explain the role technology played in industrialization.



THE INDUSTRIAL REVOLUTION

1730 - 1830





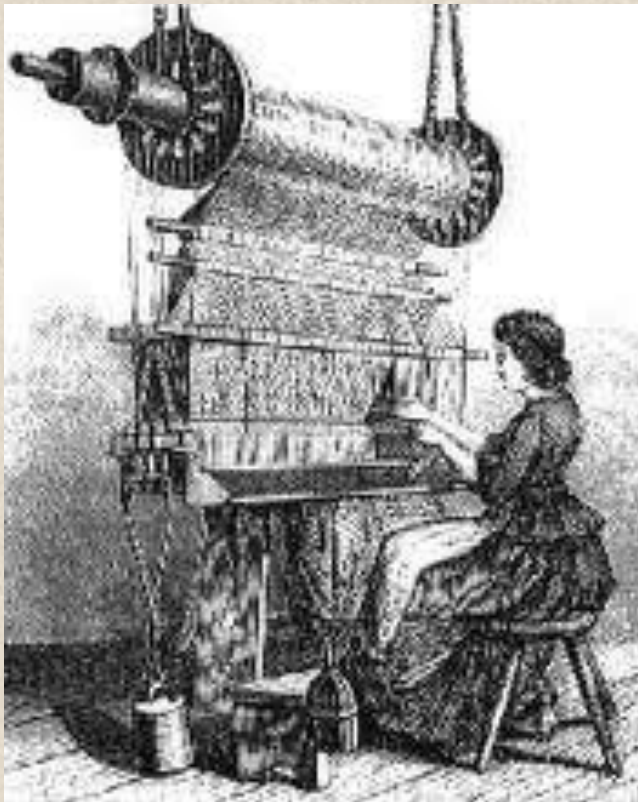
What do you own that was made entirely by you, or by someone you know well?

- The Industrial Revolution was both a rapid and long-term series of significant changes
- It shifted Western society from a focus on agriculture to industry
 - most dramatic change since **Neolithic Revolution**

Causes of Industrialization

- **Scientific Revolution**

- advances in math & science create a wave of new technology



Causes of Industrialization

- **Agricultural Revolution**

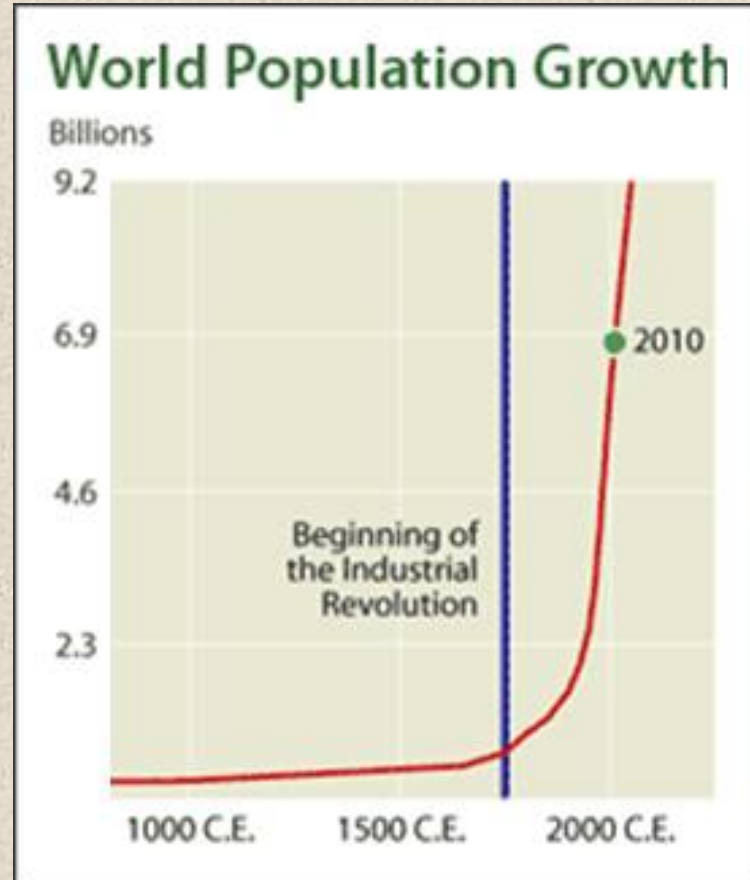
- Improved farming techniques (ex: crop rotation) and technological improvements (ex: seed drill)

Leads
to...

- Increase food supply

Leads
to...

- Increased population



Causes of Industrialization

- **New Laws**
 - **Enclosure Acts:** British laws that allowed wealthy landowners to evict tenants and create large fields
- **BUT:** farm workers forced off land they had worked for generations
 - need place to live and new jobs so they move to ...
 - **CITIES!!**
- **Urbanization:** process of population shift from rural (country) areas to urban (city) areas.



Causes of Industrialization

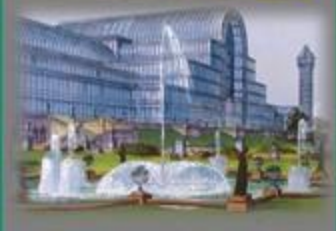
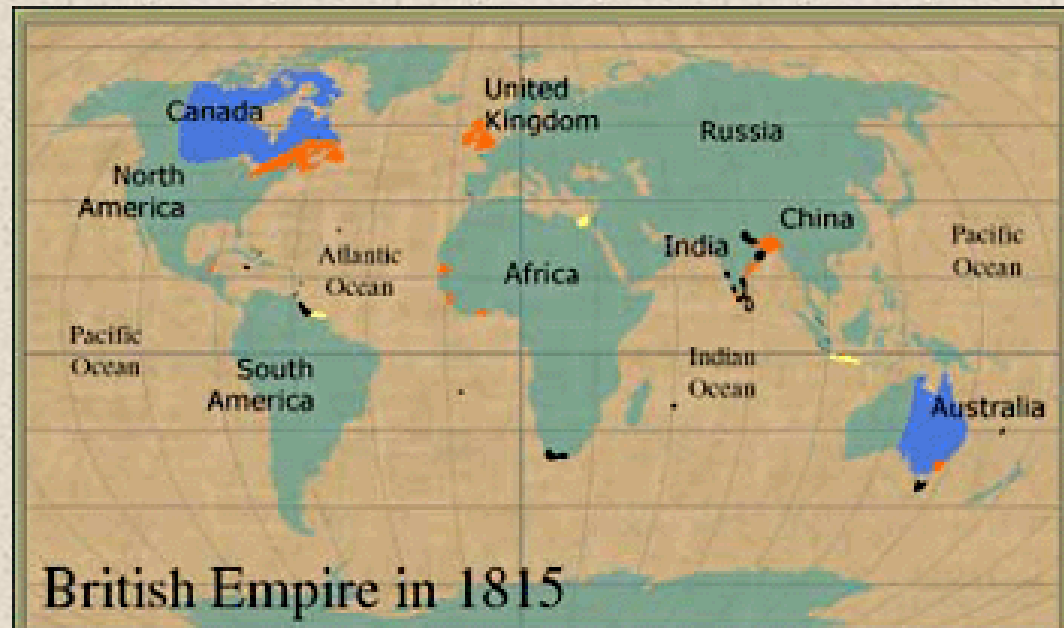
- Political and economic stability of Great Britain



Why England?

Political:

- **Limited monarchy:**
 - Parliament keeps English kings from taking too much \$\$ in taxes
- **Expansion of Empire:**
 - Access to raw materials & markets to sell industrial goods



Why England?

Economic:

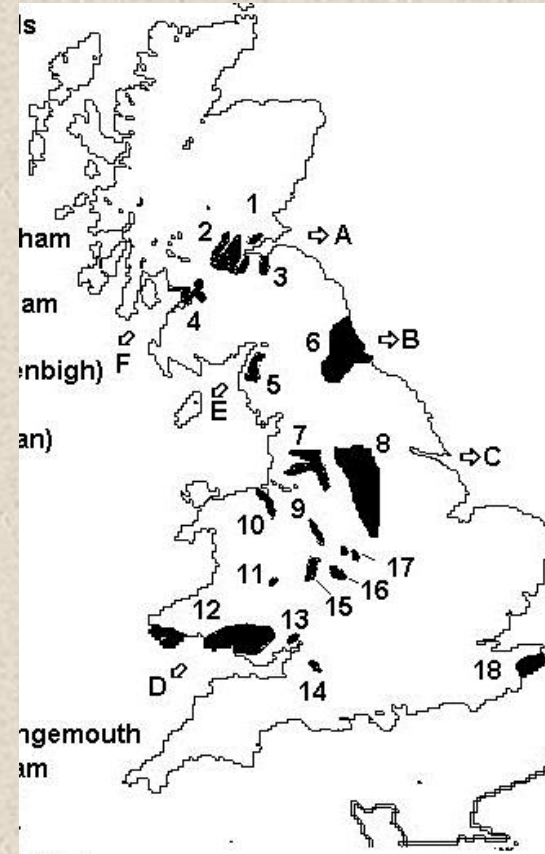
- **Laissez-faire capitalism** means government leaves business alone
- **Cheap labor:** crowded cities, desperate people
- **Rise of middle class:** money to invest in business opportunities



Why England?

Geography:

- Large amounts of **iron & coal** deposits
- **Rivers** for power (watermills) and transportation (canals)
- **Island** = isolated from wars in Europe
- **Harbors** for getting materials to & from colonies



Why England?

Social:

- **Chance to improve social status with \$:** could become nobility with enough \$\$
- **Protestant Work Ethic:** Hard work & success meant you were one of God's chosen
- **Concentration of wealth:** it takes money to make money...



Cottage System

- What: Also known as the **Domestic system**



Cottage System

- Merchants would provide raw materials to families who would make finished goods for payment
 - Ex: bolts of cloth → shirts, dresses, etc.

Advantages:

- Extra income for families
- Inexpensive for merchants

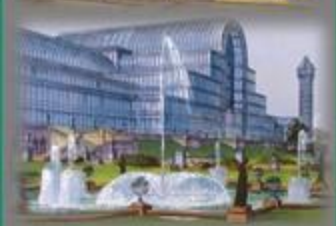
Disadvantages:

- Hard to control workers (ex: missing materials)
- Couldn't guarantee production



Factory System

- Businessmen needed a way to control workers...
 - **Central location:** needed land & expensive machines, meant your employees couldn't become your competition
 - **Division of labor:** Each person is only making one part of an item – no training required, easy to replace employees
 - **Machines for complex tasks** – could work for hours, without needing lunch/bathroom breaks



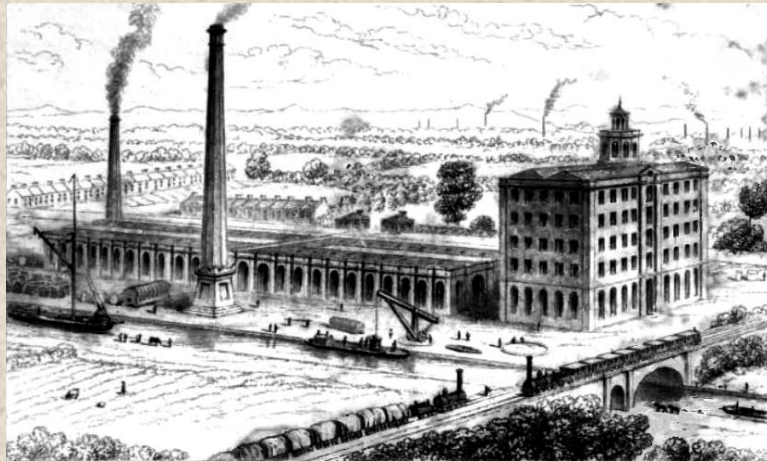
- **Before** the Industrial Revolution goods were made using the **Domestic System**

- Goods made by hand in people's homes.



- **During** the Industrial Revolution goods were made using the **Factory System**

- goods made in big factories using large machinery



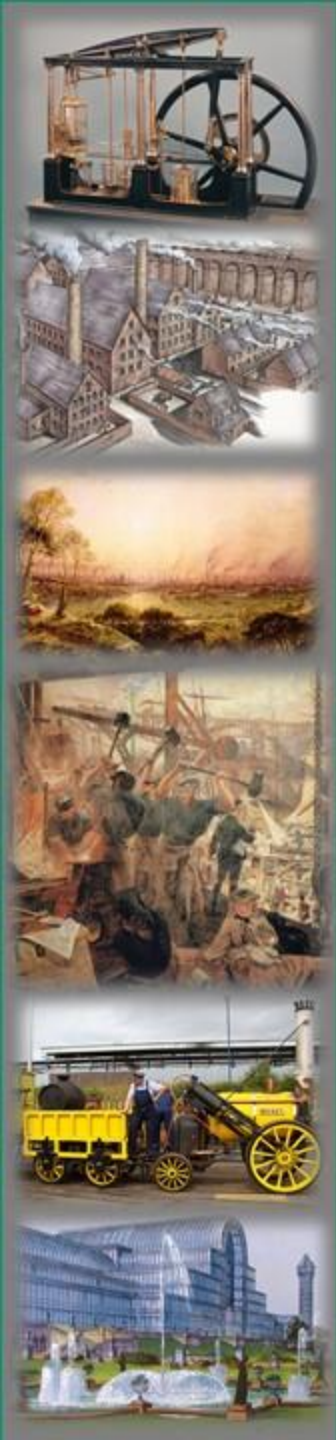
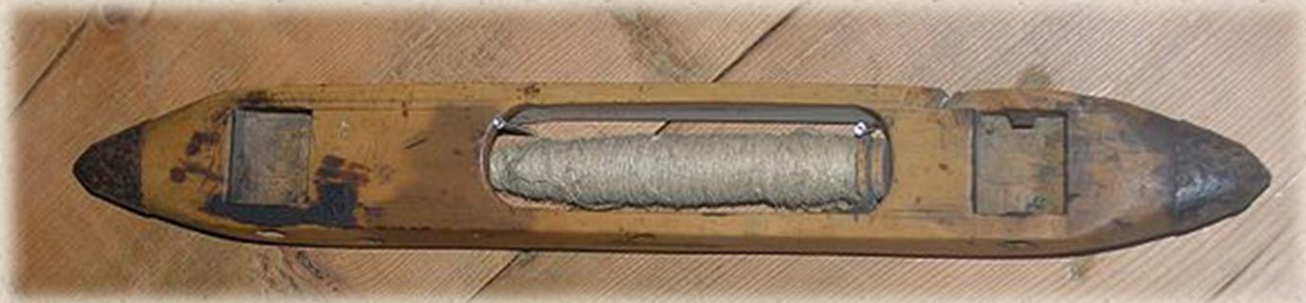


Technology of the Industrial Revolution

Began in the *textile* (fabric) industry

John Kay Flying Shuttle

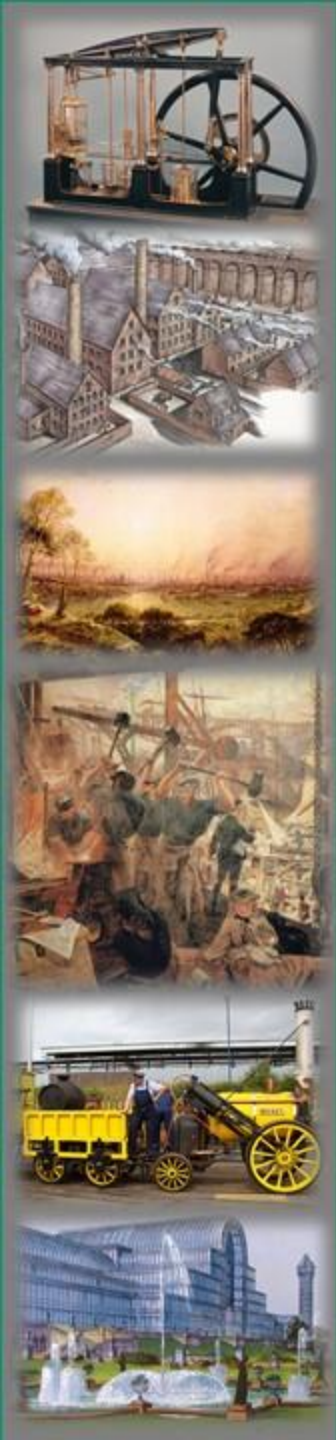
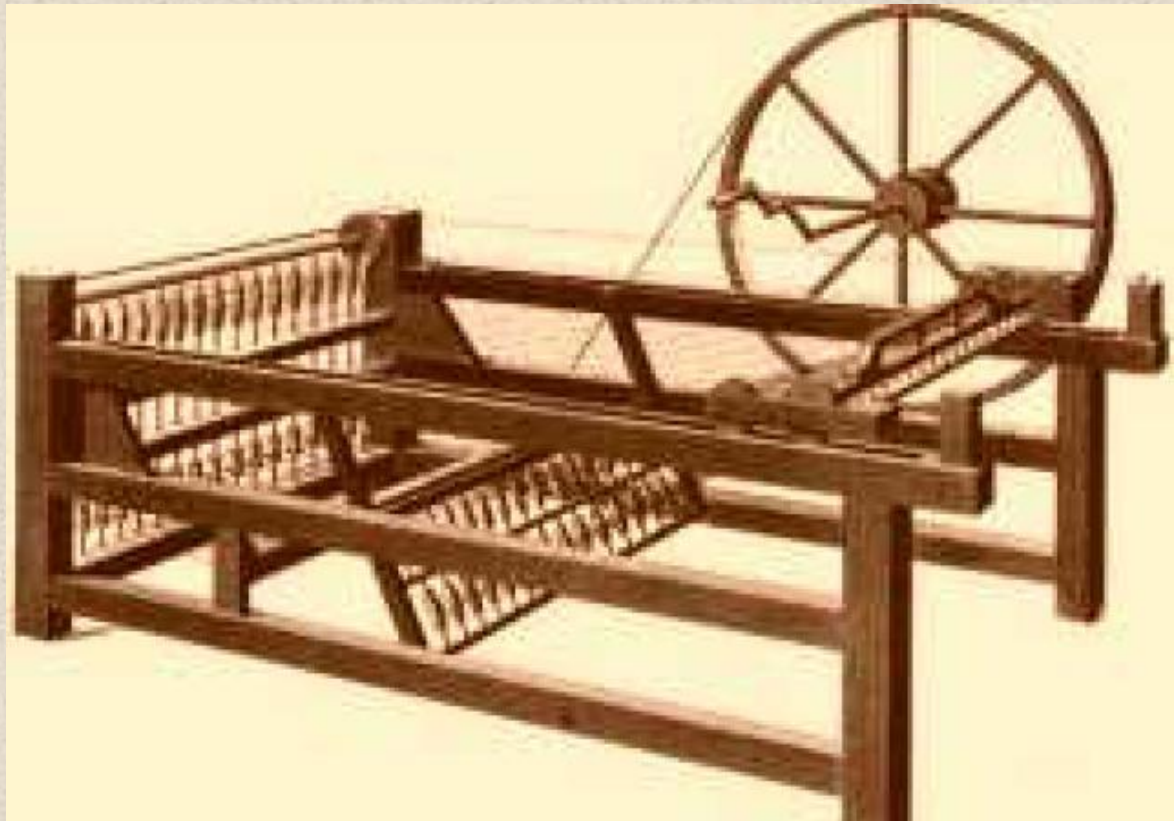
- Enabled a weaver to throw the shuttle back and forth on a loom with one hand
- **Increased cloth production**



James Hargreaves

Spinning Jenny

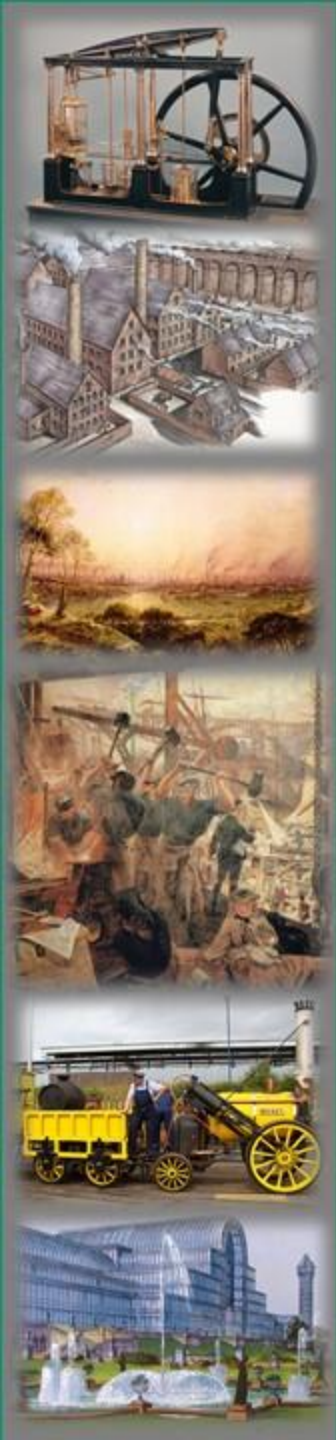
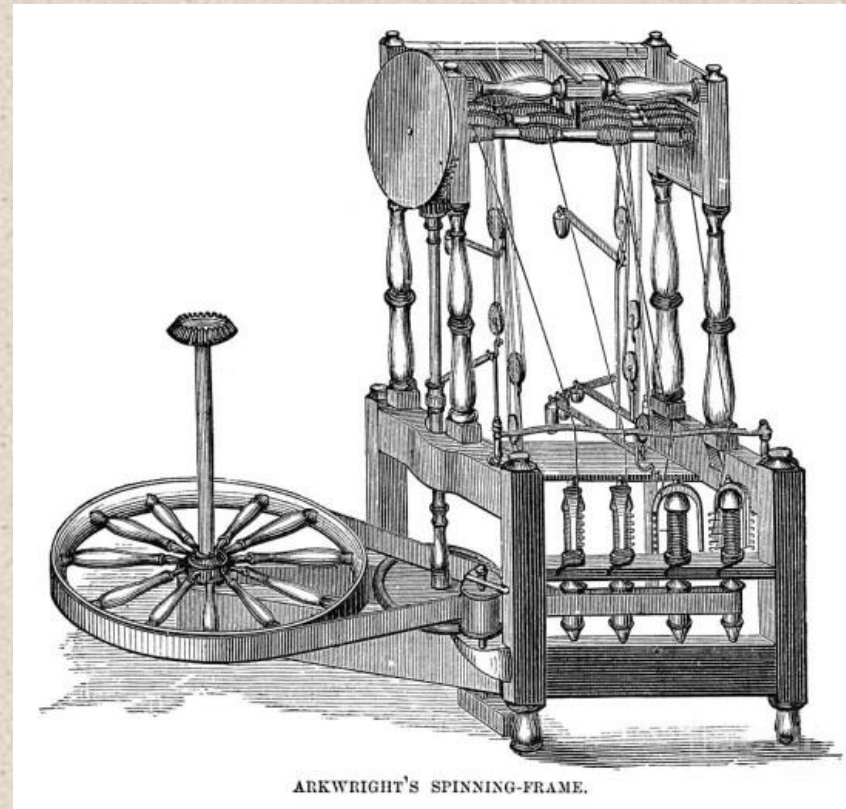
- mechanized the spinning wheel so that eight spools of thread could be spun simultaneously



Richard Arkwright

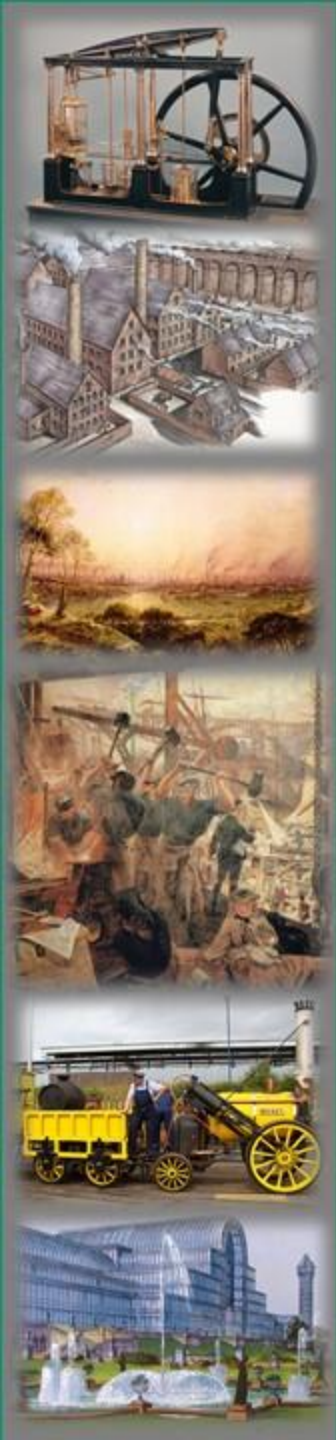
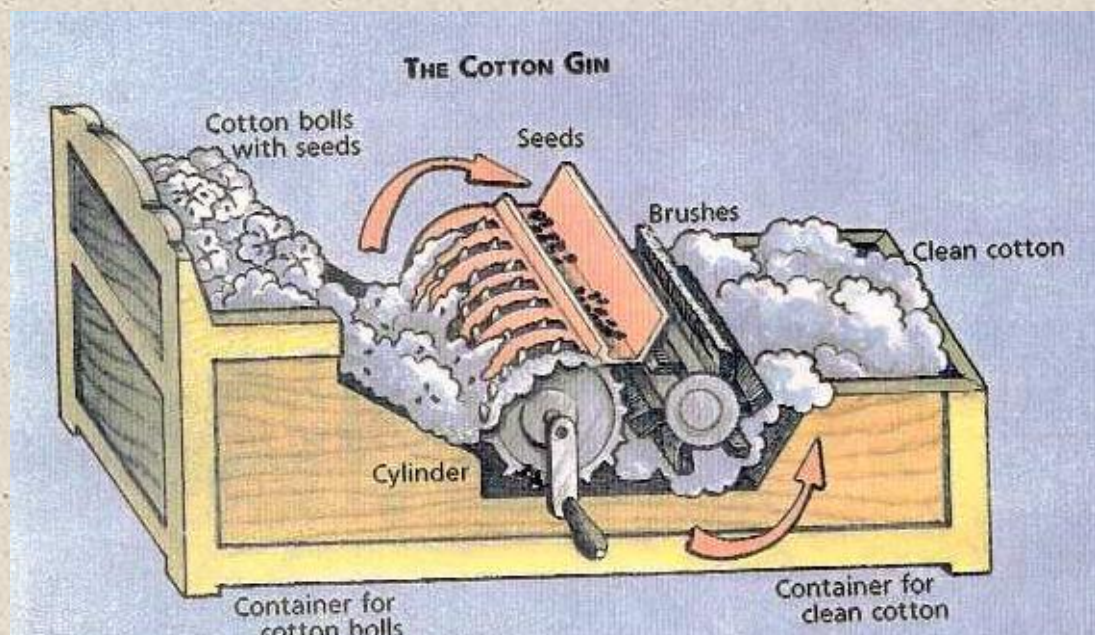
1st water-powered factory

- Water-powered spinning machines
- First to develop factory system:
 - 13 hour workdays, hired whole families



Eli Whitney Cotton Gin

- Cotton seeds difficult to remove
 - by hand, 1 person could clean 1 pound of cotton per day
 - With the cotton gin, 1 person could clean 50 pounds of cotton
- Makes cotton a cheap alternative to linen and wool fabric



Manchester, 1851

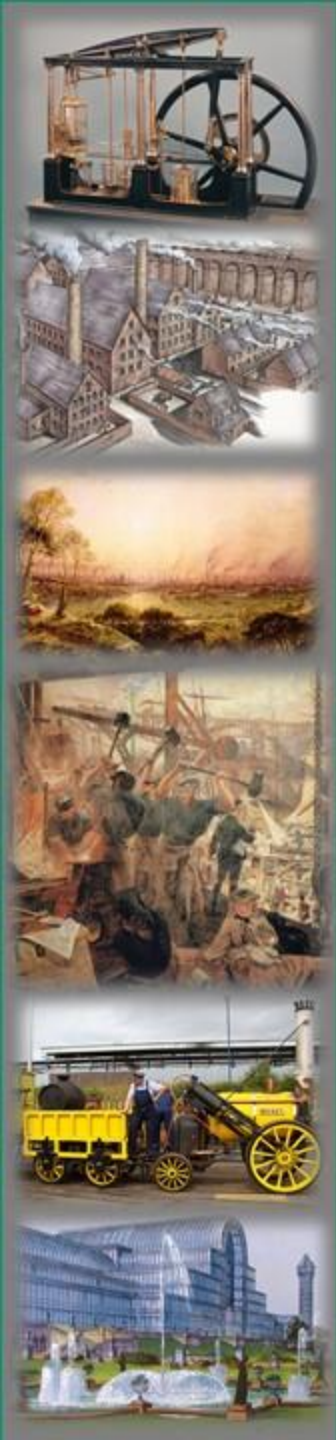
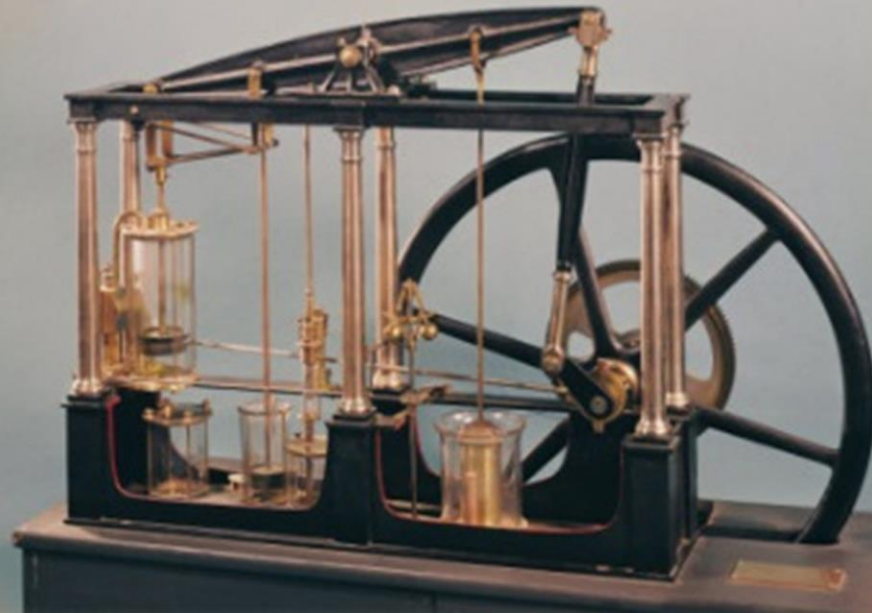




Transportation Revolution

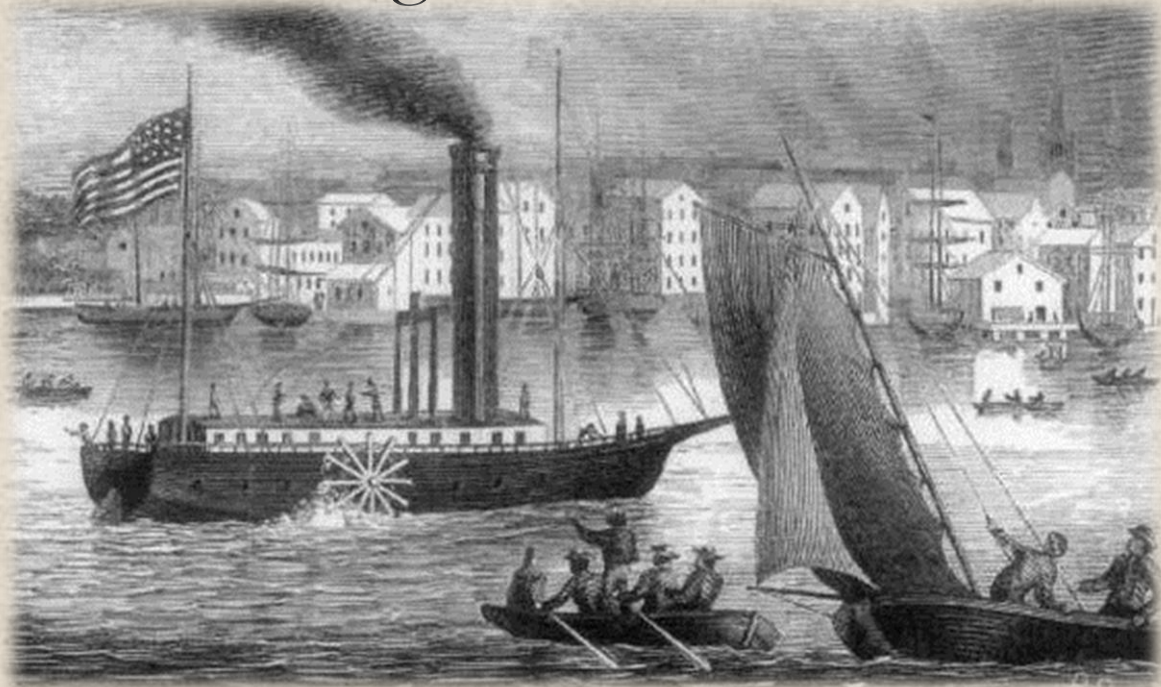
James Watt Steam Engine

- By the late 1780s, the steam engine was used regularly in English factories
- Increases use of iron in factories
- Increases use of coal for power



Robert Fulton Steamboat

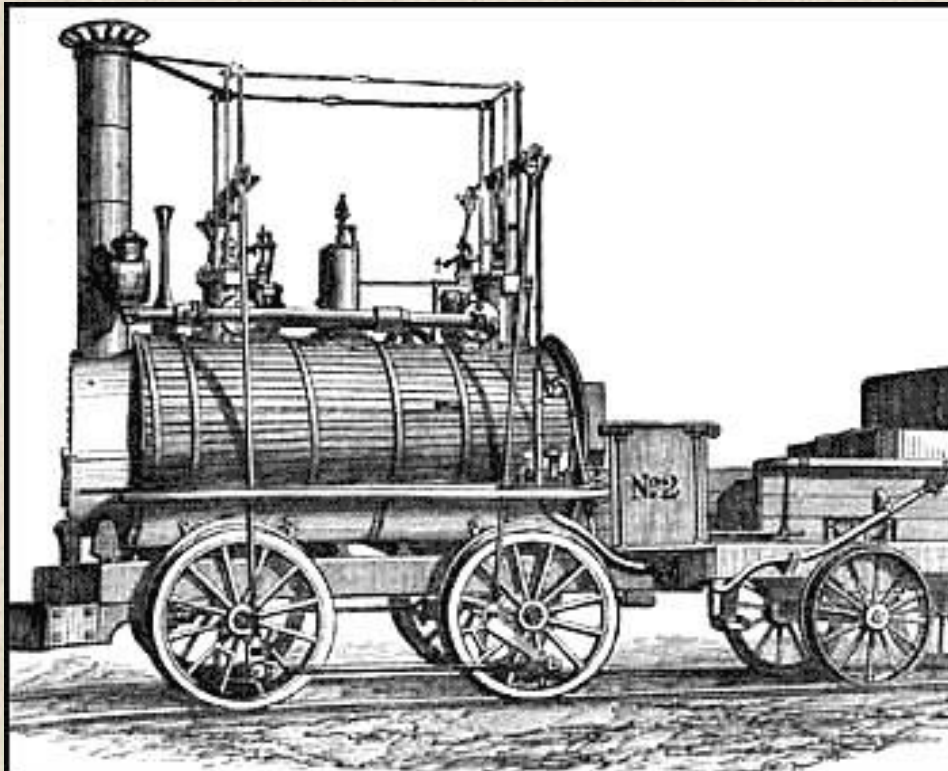
- Uses Watt's engine to travel on water
- Made two-way river travel possible and travel on the high seas faster



George Stephenson

Steam locomotive

- Cheap & fast way to move heavy items (iron, coal)
- By 1829, widely used in England

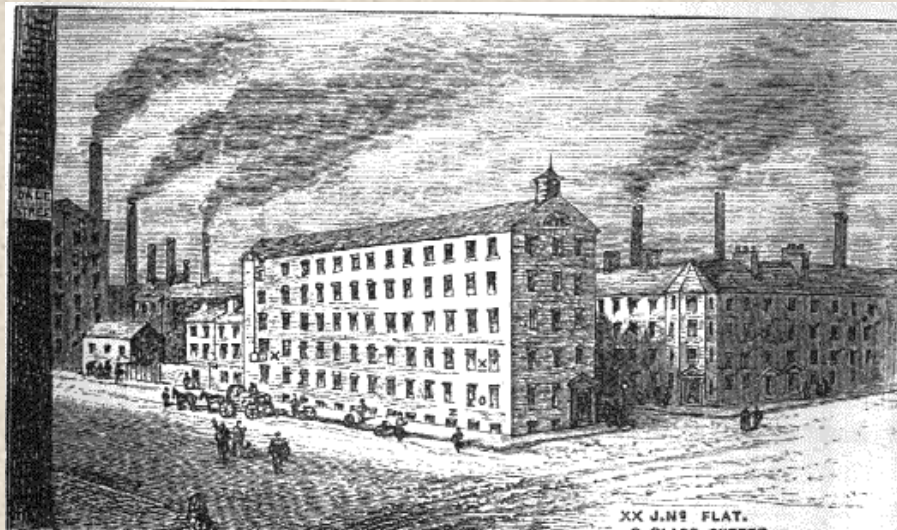


The opening of the Liverpool-Manchester Railroad in 1830. The line became the world's first inter-city railway and led to a huge wave of railroad building.



Role of the Factory System and Transportation Technology

- Large Machines necessitated moving industry out of homes (domestic system) to large buildings
- Factories needed to be near water sources for power and transportation



Role of the Factory System and Transportation Technology

- Development of Railroads during Industrial Revolution promoted factory system
- Use of **steam engine** to run machines in the factories and on **boats and trains** allowed for easier production of goods and shipment of raw materials to factories and of finished goods to markets



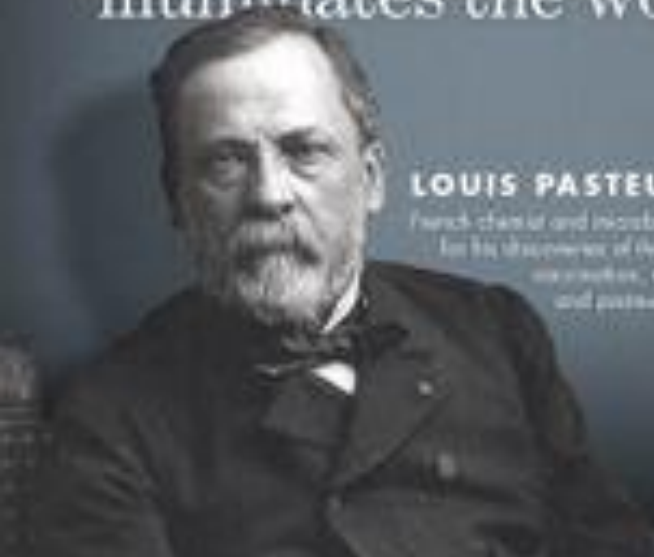


"Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less."

Marie Curie

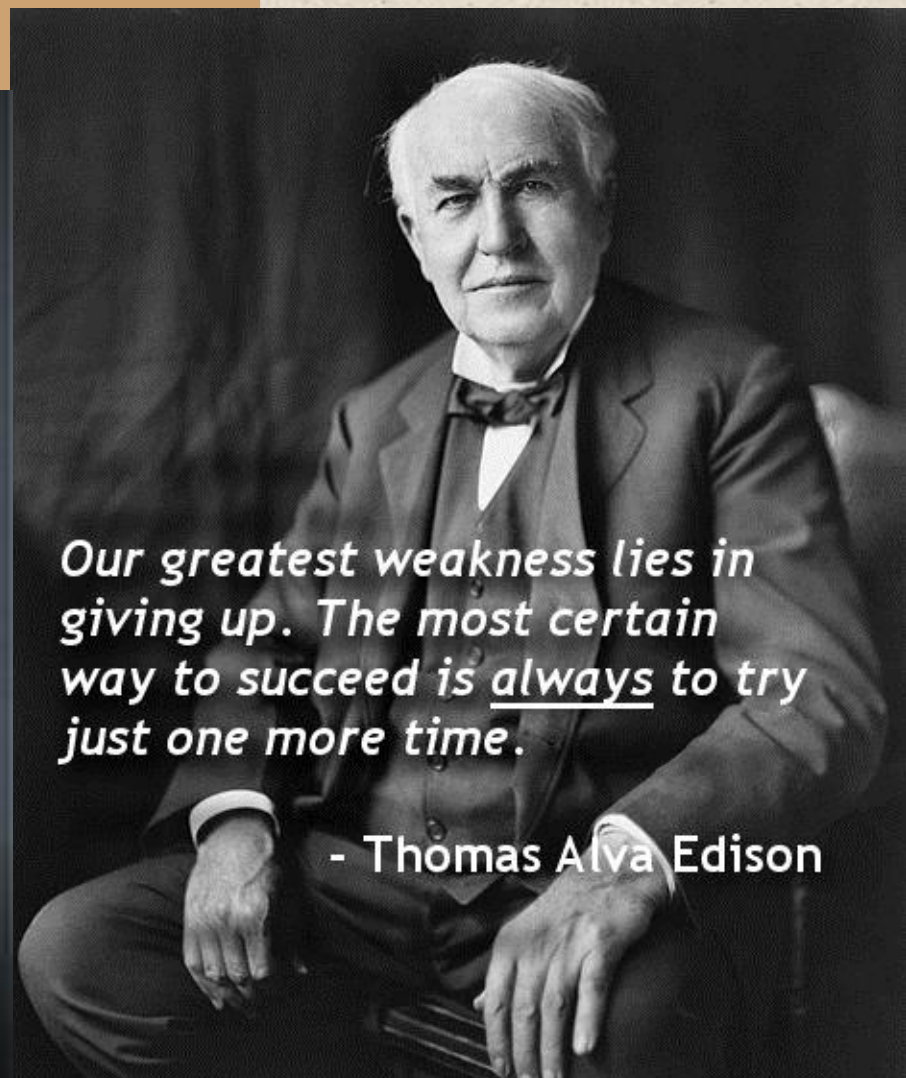
Important People

» Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world.«



LOUIS PASTEUR

French chemist and microbiologist renowned for his discoveries of the principles of vaccination, microbial fermentation and pasteurization.



Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time.

- Thomas Alva Edison

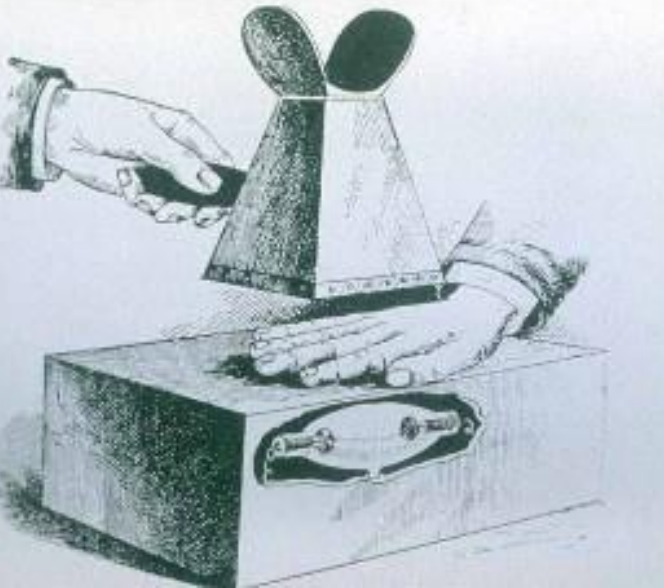
Marie Curie

<https://www.youtube.com/watch?v=ZEV4KJBIVeg>

Marie Curie



- Proved radioactivity when applied properly was effective of some diseases
- Worked to make x-ray technology available during WWI to treat wounded
- Sought funding for a hospital and laboratory dedicated to radiology to diagnose and treat disease
- Died in 1934 of exposure to radiation





Thomas Edison



<https://www.youtube.com/watch?v=HQ2RJC1a8T0>

Thomas Edison

- Inventions allowed for businesses & homes to be lighted and later have telephones
 - Extended the work day
 - Longer working hours & increased productivity
- Over 1300 patents including:
automatic telegraph machine,
phonograph, improvements to light bulb, telephone, & motion picture equipment





Louis Pasteur



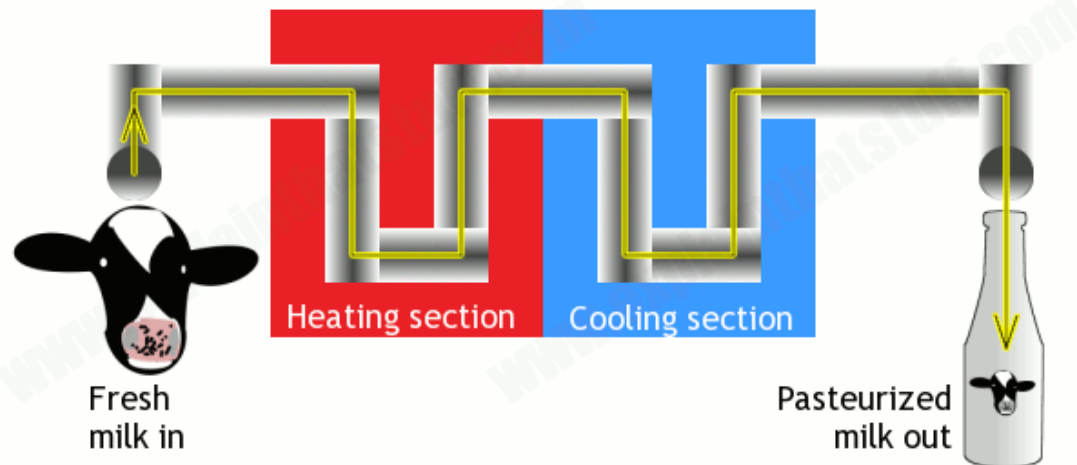
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Louis Pasteur

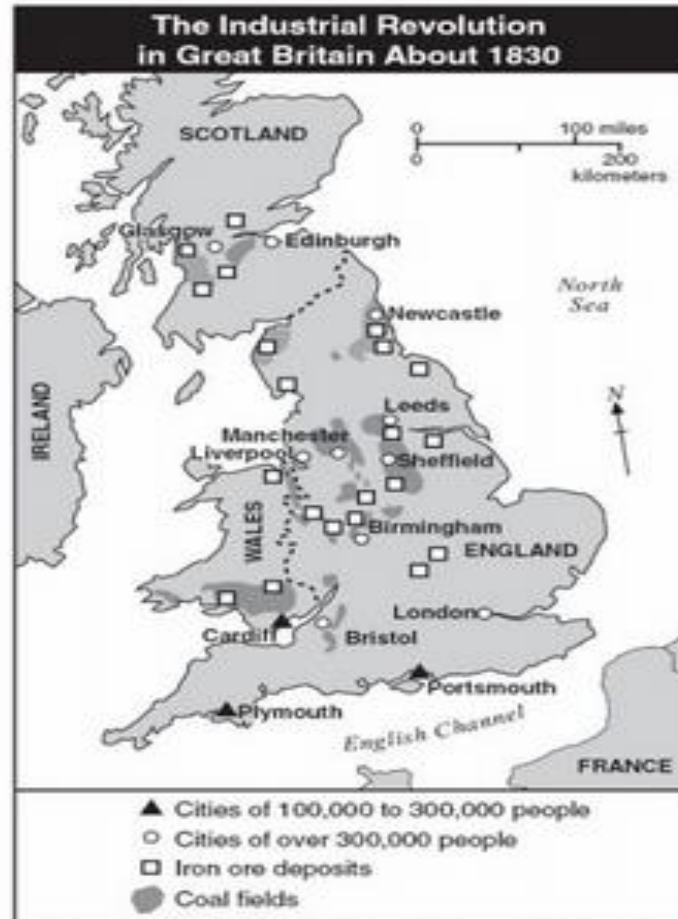
- Discovered the germ theory of disease
- Developed “Pasteurization” process
 - heat could kill bacteria which spoiled liquids
- Discovered microscopic organisms and introduced the field of microbiology

www.explainthatstuff.com



World History Writing Prompt 10.3

EXAMINE the map. **THINK** about the Industrial Revolution in Great Britain.



Source: Beers, *World History: Patterns of Civilization*, 1983 (adapted)

WRITE about why the Industrial Revolution began in Great Britain and spread throughout Western Europe.

Per Capita Levels of Industrialization, 1750-1913

	1750	1800	1830	1860	1880	1900	1913
Britain	10	16	25	64	87	100	115
Belgium	9	10	14	28	43	56	88
United States	4	9	14	21	38	69	126
France	9	9	12	20	28	39	59
Germany	8	8	9	15	25	52	85
Austria-Hung	7	7	8	11	15	23	32
Italy	8	8	8	10	12	17	26
Russia	6	6	7	8	10	15	20
China	8	6	6	4	4	3	3
India	7	6	6	3	2	1	2