

### **UNIT 3: THE INDUSTRIAL REVOLUTION**

#### **DAWN OF THE INDUSTRIAL AGE**

##### **A New Agricultural Revolution**

Improved Methods of Farming - 1700s - Dutch built earthen walls to reclaim water from the sea, combined smaller fields into larger ones to make better use of the land, used fertilizer from livestock to renew the soil

- British farmers mixed soils to get higher crop yields, tried new methods of crop rotation

- Lord Charles Townshend grew turnips to replenish the soil

- Jethro Tull - invented the seed drill - deposited seeds in rows

Enclosure Movement - enclosure - taking over and fencing off land formerly shared by peasant farmers - millions of acres were enclosed, farm output rose - profits rose because large fields needed fewer workers - farmers left villages in search for work in towns and cities

##### **The Population Explosion**

- Britain's pop. in 1700 = 5 million - in 1800 = 9 million

- Europe's pop. in 1700 = 120 million - in 1800 = 190 million

- reasons: 1. declining death rate, 2. ag. rev. reduced the risk of famine, 3. women ate better-> were healthier, had stronger babies, 4. better hygiene, sanitation, 5. improved medical care

##### **New Technology**

##### **An Energy Revolution**

- new energy sources used in the 1700s: coal - Thomas Newcomen - invented a steam engine powered by coal to pump water out of mines

- 1769 - James Watt - improved steam engine - his engine would power the Indust. Rev.

Improved Iron - coal was a vital source of fuel in producing iron, a material needed for construction of machines and steam engines

- 1709 - Abraham Darby - used coal to smelt iron (separate it from its ore) - discovered that coal gave off impurities that damaged iron -> found a way to remove impurities from coal - Darby's experiments led him to produce better-quality, less expensive iron (in decades that followed, this iron would be used in the building of railroads)

### **BRITAIN LEADS THE WAY**

**Why Britain?** - five key factors:

1. Natural Resources - large supply of coal and iron
2. Human Resources - ag. rev. freed many people from farm labor - pop. explosion created a large available workforce to mine coal and iron, build factories, run machines
3. New Technology - Britain was center of the Scientific Revolution - in 1700s, Enlightened thinkers promoted idea of progress through technology - many skilled mechanics in Britain were eager to meet the demand for new, practical inventions
4. Economic Conditions - capital - wealth to invest in enterprises (mines, factories, railroads) - business class had accumulated wealth from overseas trade - demand for goods increased with rising pop.
5. Political and Social Conditions - Britain had a stable govt. that supported economic growth - many entrepreneurs came from religious groups that encouraged thrift and hard work

**Changes in the Textile Industry** - largest industry in Britain (cloth, fabric)

#### **Major Inventions**

1. flying shuttle (John Kay) - weaving machine
2. spinning jenny (James Hargreaves) - spun many threads at the same time
3. waterframe (Richard Arkwright) - used water power to speed up spinning

**The First Factories** - places that brought together workers and machines to produce large quantities of goods

**Revolution in Transportation** - capitalists invested in turnpikes (privately built roads that charged a fee to travelers who used them), canals (dug to link rivers or connect inland towns with coastal ports), stronger bridges and upgraded harbors to help the expanding overseas trade

On Land - early 1800s - steam locomotive (George Stephenson) - world's first major rail line opened in England in 1825 (Liverpool to Manchester) - by 1870, rail lines crisscrossed Britain, Europe, and the U.S.

On Sea - 1807 - steamboat (invented by American Robert Fulton) - used Watt's steam engine to power the *Clermont* up the Hudson River in New York (traveled at a record-breaking speed of more than 5 mph!)

- chain reaction during the Industrial Revolution: large population -> increase in demand for goods -> mass production of goods in factories -> prices fell -> goods more affordable -> created more consumers who further fed the demand for goods

- Ind. Rev. affected not only how goods were made but also how people lived