# INDUSTRIAL REVOLUTION

**California Content Standards:**
**10.3 Students analyze the effects of the Industrial Revolution in England, France, Germany, Japan, and the United States.**
1. Analyze why England was the first country to industrialize.
2. Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change(e.g. the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).
3. Describe the growth of population, rural to urban migration, and growth of cities associated with the Industrial Revolution.
4. Trace the evolution of work and labor, including the demise of the slave trade and effects of immigration, mining and manufacturing, division of labor, and the union movement.
5. Understand the connections among natural resources, entrepreneurship, labor, and capital in an industrial economy.
6. Analyze the emergence of capitalism as a dominant economic pattern and the responses to it, including Utopianism, Social Democracy, Socialism, and Communism.

## HISTORY AND SOCIAL SCIENCE ANALYSIS SKILLS

**Chronological and Spatial Thinking**
1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons that were learned.
2. Students analyze how change happens at different rates at different times; that some aspects can change while others remain the same; and understand that change is complicated and affects not only technology and politics but also values and beliefs.
3. Students use a variety of maps and documents to interpret human movement, including major patterns of domestic and international migration, changing environmental preferences and settlement patterns, the frictions that develop between population groups, and the diffusion of ideas, technological innovations, and goods.
4. Students relate current events to the physical and human characteristics of places and regions.

**Historical Research, Evidence, and Point of View**
1. Students distinguish valid arguments from fallacious arguments in historical interpretations
2. Students identify bias and prejudice in historical interpretations.
3. Students evaluate major debates among historians concerning alternative interpretations of the past, including an analysis of authors' use of evidence and the distinctions between sound generalizations and misleading oversimplifications.

4. Students construct and test hypotheses; collect ,evaluate, and employ information from multiple primary and secondary sources; and apply it in oral and written presentations.

**Historical Interpretation**

1. Students show the connections, casual and otherwise, between particular historical events and larger social, economic, and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations of determining cause and effect.
3. Students interpret past events and issues within the context in which an event unfolded rather than solely in terms of present day norms and values.
4. Students understand the meaning, implication, and impact of historical events while recognizing that events could have taken other directions.
5. Students analyze human modifications of a landscape, and examine the resulting environmental policy issues.
6. Students conduct cost/benefit analyses and apply basic economic indicators to analyze the aggregate economic behavior of the U.S. economy.

**Read Spielvogel pp: 561-588, 638-641, 651-673**

Industrialization
- Manufactured goods had traditionally been made in home by guilds
- specialization - process by which people pick one task or trade
- machines begin to replace human labor
  - more efficient and cost effective
- combination will eventually lead to world wide economy

Agriculture improvements
- enclosure
  - population growth eliminates available land
  - farmers begin to fence off land
  - must find new ways to increase production
- crop rotation
  - three field system brings more land into production
  - 1721 - Jethro Tull invents the seed drill
    - makes planting more successful
- improved livestock
  - breeding is used to increase the size of livestock
  - 1700 -1786
    - cows - 370 to 840 lbs.
    - sheep - 28 to 100 lbs.
- allows more money for families to purchase manufactured goods
- population continues to grow dramatically
  - see chart pg. 663
  - provides labor needed for factory system

Factory System
- manufacturing will move out of the cottage industry
- access to running water for power for machines

- very little land available
- development of iron ore industry makes metal for machines available
- work moves out of homes into independent structures
- workers now traveled to get to work
  - new transportation makes this possible
  - dramatically changes nature of family relationships
- Captains of Industry(capitalists) will provide money for factories
  - AKA Robber Barons
    - ruled over workforce with brutal efficiency

Great Britain leads the way into the Industrial Revolution

- Natural resources
  - Britain has an abundance of waterpower and coal
- geography
  - island with few resources has to trade
  - harbors provide access raw materials and markets
- interested in technology
  - British had natural inclination to work for change
  - Royal Society's financed many inventors
- strong finance
  - Bank of England - 1694
    - provided sound financial system
  - will lead to the development of the factory system
- political stability
  - few wars and favorable business laws
- Obstacles to Industrialization
  - Britain passes many laws forbidding exportation of ideas
    - keeps them ahead of the continent for some time
  - Guild systems tended to be stronger
  - transportation was more difficult
  - Napoleonic wars were also disruptive

Textile Inventions

- initially, spinners and weavers worked in the home(cottage industry)
- rapidly increasing population increase demand for clothes
- flying shuttle
  - doubled the speed of weaving
- spinning jenny
  - invented by James Hargreaves
  - hand operated machine doubled speed of spinning
- water-frame
  - invented by Richard Arkwright
  - used running water to power machines
    - more efficient that human power
- spinning mule
  - invented by Samuel Crompton
  - combined water frame and spinning jenny
  - built into factories

- power loom
  - invented by Edmund Cartwright
  - dramatically increased the speed of weaving
- Raw materials came into great demand
  - increased value of colonies
    - most British cotton produced in American South
- cotton gin
  - invented by Eli Whitney
  - quickly separated seeds from raw cotton
  - encouraged slavery in the colonies

Entrepreneurs
- individuals who start new businesses

Steam engines
- first invented by Thomas Newcomen
  - needed to find mechanical method to remove water from mines
  - Britain was dangerously short of lumber for fuel
- James Watt perfects the steam engine in 1765
  - allowed for factory production anywhere
    - factories moved out of mountains into cities
  - Watt becomes rich through licensing agreements

New forms of business organization emerged to deal with demand
- Sole proprietor- single owner of business
  - Advantages: All profit and own boss
  - Disadvantages: Could lose everything, not much capital
- Partnerships - usually 2 to 12 owners
  - partnership agreement gives limited liability
    - only risk assets of business, not personal; more capital
    - have to share profits, work with others
- Corporations - potentially thousands of owners
  - sell shares of stock to raise massive capital
  - still have limited liability
  - shareholders elect Board of Directors to run company
    - hire Chief Executive Officer(CEO)
- Trusts and cartels form to make business larger
  - people served on board of multiple corporations
    - vertical integration - moving into related businesses
    - horizontal integration - moving into same business

Transportation Revolution
- Railroads
  - invented by Richard Trevithick, perfected by George Stephenson
    - utilize steam for propulsion
  - Railways boom
    - 1850-80 worldwide
      - 23,600 to 228,400 miles
        - transcontinental RR is built in US
- Railroads had multiple effects

- industrial transport - move goods for sale to markets
- jobs - massive 2nd order effects
- agriculture - populations could be fed from large areas
- travel - people had means to visit more areas

railways crisscross England, Europe, and US

telegraph - revolutionizes communication

- invented by Samuel Morse
  - Morse Code

steamships

could move without relying on wind or oars

Suez Canal

- links Mediterranean Sea with Indian Ocean
  - no longer necessary to sail around Africa

Cities grew

population growth and enclosure forced thousands into cities

- sought work in the factories

social problems followed

- Row or Tenement houses
  - see drawing on pg. 578
  - people crowded into extremely small apartments
  - little air, light, electricity, plumbing
    - no social services
  - disease was more likely to spread
    - cholera
- many uneducated workers were taken advantage of
  - poor food, organized crime, confidence schemes
- Working conditions
  - people worked 14-16 hour days, six days a week
    - see inset on pg. 568
    - many also worked on Sundays
      - few breaks and holidays
  - equipment was often cheap and dangerous
    - many workers lost limbs and lives
    - it was more cost effective to replace labor
    - no worker's compensation or unemployment
      - see quotes pg. 580-1
- Child labor was horrible
  - children were used to get into small spaces
    - cheaper source of labor
  - often worked in textiles and mines
    - stunted their growth in many ways
      - see insets pp. 582-3
- Emigration
- millions of Europeans left looking for new life
- sought more opportunity or to escape persecution
  - Irish potato famine

- middle class expands
  - growing demands for educated professionals
  - business owners also added to the industrial middle class
  - money available to give middle class children educations
    - many will become social reformers
      - muckrakers
    - reformers bring sewer and trash to cities
    - city planning also became a serious profession
- Workers attempt to reform the system
  - Trade Unions
    - workers organized by industry
      - demanded higher wages, better conditions
    - strikes were used to achieve goals
      - government and police sided with capitalists
    - Unions also limited by industry and exclusion
      - will eventually begin to work together
    - German Social Democrats work for political influence
      - run candidates for Reichstag
    - Jean Jaures led the French socialists
      - advocated spending wealth on social programs
      - helped to unify socialists of Europe
    - Anarchists provided an alternative for some workers
      - believed in the destruction of state
        - see quote pg. 660
      - paint all revolutionaries in poor light

Marxism

- By 1870, much of the European continent was industrialized
  - brought difficulties to all as well
  - governments almost always supported business over labor
- Karl Marx
  - German philosopher and historian
  - 1848 - publishes Communist Manifesto w/ Friedrich Engels
    - see inset pg. 641
    - argued that history constantly evolves
    - Middle Ages - Feudalism - Capitalism
    - believed class struggle was more important than nationalism
      - bourgeoisie v. proletariat
    - workers of the world will eventually overthrow capitalists
    - they will then establish classless egalitarian society
- world - wide influence to present day

New Products and Inventions will continue the Industrial revolution, 2nd Ind. Rev.

- Steel
  - iron blasted through with carbon
  - blast furnace invented by Henry Bessemer
  - lasts 15 times longer than iron
    - hold sharper edge, stronger

- skyscrapers are built using steel as base
    - elevators are invented to move up buildings
    - electricity(1890's) provides new power and inspiration
- Thomas Edison
    - "Wizard of Menlo Park"
    - more than 1000 patented inventions
        - stock ticker, electric light, phonograph
    - first to utilize a team of inventors
- Alexander Graham Bell
    - invents telephone to revolutionize communication
- Guglielmo Marconi
    - invents radio and revolutionizes mass media
- internal combustion engine
    - perfected by Gottlieb Daimler
    - replaced steam with petroleum
        - smaller and provided more power

Henry Ford

- brought new strength to industry by perfecting factory process
    - mass production - making a large number of something
    - assembly line - highly specialized conveyor for production
    - interchangeable parts - all cars will be the same
        - easily constructed and repaired
    - Model T Ford - AKA "Tin Lizzie"
        - cost just $500 and could be bought by anyone
    - spurns entire new industries

Wright Brothers

- successfully complete first airplane flight in 1908 at Kitty Hawk, NC

Women had severely limited economic opportunity

- Jobs
    - House servant
    - teachers
    - Factory worker
        - garment industry
        - lower paying
        - "protection" laws made it more difficult to find work
        - unions didn't allow female members
    - Nursing
        - Florence Nightingale
        - Nightingale school for nurses
            - opens a whole new career for women
    - clerks and offices
- Business laws severely discriminated against women
    - Couldn't own property
    - could not make contracts or sue
    - could not get divorced
    - 1900 - no voting

Mass Culture

- changing economic conditions changed everyday life
- successful reforms gave workers more time and money
- by 1900, compulsory universal education was standard
    - Nations needed to have educated population
        - many were now voting citizens
        - encouraged Patriotism and national unity
        - trained population for new economy
        - took children out of the workforce
        - literacy rates dramatically increased
            - newspapers began to expand
- Leisure created demand for cheap entertainment
    - the radio let to dance halls
    - automobile lead to rise in tourism
    - Sports became increasingly popular amongst working class
        - soccer, baseball, football, basketball
            - Jim Thorpe and Babe Ruth
    - Movies also began to draw large audiences
- Advertising and celebrities began to influence society more