**Study Guide 2nd Industrial Revolution, Reform, Mass Politics, Science:**

1. The **“Second” Industrial Revolution** (c. 1870-1914)
   1. The “first” Industrial Revolution had occurred between 1780-1850 – textiles, coal, iron, railroads
   2. The **Second Industrial Revolution** increased the **mass production** of goods with new technologies:
      1. Steel production: steel rails, larger structures, heavy machinery

* The **Bessemer process** resulted in high-quality steel that was produced much more efficiently and far less expensively than before.
  + 1. Oil: kerosene for lighting; used by the **internal combustion engine** for factory machines
    2. **Electricity**: increasingly powered cities
       1. Following American inventor Thomas Edison’s development of a power grid in the late 1870s, England built the first European electric power stations in 1881.
       2. The steel, textile, shoemaking, and construction industries increasingly used electricity.
    3. **Chemicals**: Germany led in photo processing and other areas such as dyes, soaps and pharmaceuticals; also fertilizers and explosives
  1. By the **1890s Germany became the most powerful industrial economy in Europe (surpassing Britain)**
     1. Britain’s huge investment in technology early on meant that it was more difficult to shift to new techniques of the Second Industrial Revolution.
     2. Germany came into industrialization later and was able to utilize state-of-the-art technology.

Germany thus led Europe in the production of organic chemicals and power generators

1. The expansion of industry and technology created a growing demand for experts with specialized knowledge.
   * 1. Science and technology became closely linked.
     2. Professional occupations grew or emerged among the bourgeoisie: engineering, architecture, chemistry, accounting and surveying.

The management of large public and private institutions also emerged as a profession

* + 1. It expanded and diversified the lower middle class.

1. The number of independent, property-owning shopkeepers and small business people grew.
2. Increase in white-collar employees: salesmen, bookkeepers, store managers, and clerks.
3. Industrialism continued to attract huge numbers of workers to cities: the proletariat.
4. By 1900 over half of industrial workers in Britain, Germany and Belgium worked for companies with more than twenty workers.
   1. New technologies and means of communication and transportation resulted in a truly global economic network.
5. **Urbanization**
6. Population growth
   * 1. Britain was the first large European country to experience urban growth.
        1. Over 50% of the population in 1891 lived in urban areas.
        2. London was by far the largest city in Europe.
     2. The population of Europe increased by 50% between 1870 and 1914.
        1. By 1900, 9 European cities had populations over 1 million.
        2. Significant declines in mortality rates occurred, especially among children.
        3. Birth rates actually fell during the period (e.g. France).
     3. Better medical knowledge, better nutrition and housing were key reasons.
     4. The number of children per family fell, though this trend was more pronounced in the middle class.
   1. Poor living conditions during the first half of the 19th century
7. Parks and open spaces were almost nonexistent.
8. Many people lived in extremely overcrowded attics or cellars (as many as 10 people per room).
9. Open drains and sewers flowed along the streets with garbage and human excrement.
10. No public transportation existed.
    1. **Public health movement**
11. It sought to remedy the high disease and mortality rate that occurred in cities.
12. Liberalism shifted from laissez-faire to interventionist economic and social policies on behalf of the less privileged; the policies were based on a rational approach to reform that addressed the impact of the Industrial Revolution on the individual.
13. **Edwin Chadwick** became the most important reformer of living conditions in cities.
14. He was influenced by **Jeremy Bentham’s utilitarianism**: the “greatest good for greatest number.”
15. He saw disease and death as primary causes of poverty.
16. The **“Sanitary idea”** was the most important: it held disease could be prevented by cleaning up the urban environment.

* Sewage and water systems provided an adequate supply of clean piped water that would carry off excrement of communal outhouses.
* It would cost only 1/20 of removing it by hand.

1. Britain (which suffered a cholera epidemic in the early 1830s), passed its first public health law in 1848.

* Germany, France and the U.S. also adopted Chadwick’s ideas.

1. By the 1860s and 1870s many European cities had made significant progress in public sanitation.
   1. **Urban redesign** and **public transportation**
2. France took the lead during the reign of Napoleon III.
   1. **Georges von Haussmann** redeveloped Paris:
      * Wide boulevards were built (partially to prevent barricades used in the popular uprisings in France).
      * Better middle-class housing was developed on the outskirts of the city.
      * Demolition of slums
      * Creation of parks and open spaces.
   2. A new system of aqueducts doubled the fresh water supply and 400 miles of underground sewers were built (in response to cholera epidemics in 1832 and 1849).
   3. Cities such as Vienna and Cologne followed Paris’ lead.
3. Public transportation
   * + 1. By the 1890s the **electric streetcar** had revolutionized city transportation.

* They facilitated the creation of suburbs on outskirts of cities.
* Electricity led to the creation of London’s subway system in the 1860s and then Paris’ *metro* in 1900.
  + - 1. By 1900, only 9% of Britain’s urban population was overcrowded (more than 2 per room).
  1. Migration and emigration

1. Significant migration to cities from the countryside continued although migrants often maintained a connection to their rural areas.

2. Huge numbers of southern and eastern Europeans migrated to America’s largest cities after 1880 in search of economic opportunity.

1. Canada and Latin America were also major destinations.
2. Jews in eastern Europe fled the persecution of the *pogroms*.
3. In some areas, agricultural challenges forced people to search for other opportunities.
4. Changes in social structure as a result of the industrial revolution and urbanization
   1. An increase in the standard of living occurred by the 2nd half of 19th century due to heightened consumerism.
5. The gap between the wealthy and working class was still huge, however.
6. This period became the “golden age of the middle class.”
7. Earlier in Britain, wages and consumption had already increased 50% between 1820 and 1850.
   1. Industrial and urban development made society more diverse and less unified.
      1. Diversity within the middle class/bourgeoisie
         * 1. Constituted about 15 to 20% of the population in western Europe

* Less in eastern Europe (2% in Russia) where nobles dominated business
  + - * 1. Upper-middle class: bankers, industrial leaders, large-scale commerce, top gov’t officials
* Families tended to employ several servants.
  + - * 1. Diversified middle class: smaller businessmen, professionals, merchants, doctors, lawyers, civil servants
* Employed at least one servant as a cook and maid.
  + - * 1. Lower-middle class (***petite bourgeoisie***): independent shopkeepers and small merchants, store managers, minor civil servants, teachers, clerks, and some master craftsmen such as goldsmiths
* Grew from about 7% of the population to 20% in 1900.
* Women worked as department store clerks, stenographers, secretaries, waitresses and nurses.
  + Women held more than half of the post office and gov’t clerical jobs in 1911.
    1. Characteristics of the middle class:
       1. Believed strongly in classical liberalism and sought protection of property in constitutional assemblies (e.g. British Parliament and the French Chamber of Deputies)
       2. Gained political influence though increased landownership that was tied to voting rights
       3. Emphasized individual liberty and respectability based on economic success
* Expanding the family’s fortune was seen as the clearest means of respectability
  + - 1. Families emphasized frugality and planning for the future
      2. Saw the family as the foundation of the social order
      3. Education and religion (especially evangelical Protestantism in England, the Netherlands and some German states and Catholicism in France) were seen as extremely important
      4. Strong feelings of nationalism
    1. Working class: about 80% of the population
       1. Many were peasants and hired hands (especially in eastern Europe)
  1. The changing family
     1. Romantic love became the most important reason for marriage by 1850—a companionate marriage became the ideal.
        1. The rising standard of living made it possible for people to marry at a younger age.
     2. The high rate of illegitimacy among the working class decreased after 1850.
* The high rate of premarital sex remained but more couples married if the woman became pregnant.
  + 1. Prostitution: Middle- and upper-class men comprised most of the customers as they tended to marry late.
    2. **Separate spheres:** After 1850 the work of most wives was increasingly distinct and separate from their husbands.
       1. This stood in stark contrast with pre-industrial Europe where farming and the cottage industry dominated and husbands and wives worked together.
       2. Husbands became the primary family wage earners.
       3. Child rearing was more child-centered with the wife dominating the home domain.

1. Life in the **fin de siècle** (end of the century)
   1. The **“Belle époque”** (c. 1895-1914)

1. An increased standard of living occurred in all industrialized countries.

* + - 1. This period would later be remembered after World War I as the “Belle époque”(the “good old days”).
      2. However, better living occurred much more in northern Europe (Britain, France and Germany) than in southern or eastern Europe.
      3. People gradually enjoyed higher wages while the price of food declined.
* In Britain, wages almost doubled between 1850 and 1900.
* More money came to be spent on clothing.
* Meat consumption increased significantly, partly due to the advent of refrigerated railroad cars and ice boxes.
  + 1. Increased leisure time resulted in more money being spent.
* People increasingly frequented parks, beaches, museums, theaters and opera houses.
  1. Heightened consumerism
     1. Sports attracted increased spectators and participants.
        1. Sports clubs grew significantly.
        2. Soccer (football), rugby, bicycle and automobile races, track and field
        3. A huge bicycle craze swept western Europe in the 1890s.
        4. Increased numbers of women took part in bicycling and sports clubs.
* Women gradually abandoned the more restrictive clothing (e.g. corsets, whale-boned skirts) for dresses that allowed more movement.
  + - 1. The emerging sports culture mirrored the growth of

aggressive nationalism in the late-19th century.

* Some Social Darwinists believed that sports competition confirmed the superiority of certain racial groups.
  + 1. Cafés and taverns enjoyed increased patronage in cities and towns.
    2. **Department stores** grew significantly and were frequented by the middle-class.
* Catalogues also enjoyed popularity.
  + 1. In Paris, dance halls, concerts and plays drew thousands of people each week.
    2. Advertising became big business.

C. New inventions marked the era

1. Telegraph
2. Telephone
3. Automobile
4. Gramophone (record player)
5. Radio (invented by Marconi)
   * 1. Airplane
   1. Education
6. The state’s role in education increased, leading to the further secularization of society.
7. Education often emphasized loyalty and service to the state while decreasing the influence of organized religion.
8. By 1900 in England, all children five to twelve years old were required to attend primary school.
   * Education was free.
9. In France, the Ferry Laws required children ages 3-13 to attend primary schools; schools were free.
10. Significant increase in literacy
11. Men had higher rates of literacy than women.
12. Urbanites were more literate than rural folk.
13. Higher literacy rates existed in northern and western Europe than in southern or eastern Europe.

* By 1900, a 99% literacy rate existed in Germany compared to 25% in Russia.

1. Girls had less access to secondary education than boys, though schools for girls grew somewhat.
   * 1. Families had to pay the cost.
     2. Education was seen as a means of improving economic and marriage prospects for girls.
2. Scientific Advances
   1. Scientific ideas and methods enjoyed huge popularity and prestige in the public mind after 1850.
      1. To many, science became almost a religion (positivism).
      2. People could see how the link between science and technology improved their quality of life (e.g. electricity and better medical care).
   2. Bacterial revolution
      1. Significant in reducing the mortality rate
      2. **Louis Pasteur** (1822-1895) developed the germ theory of disease.
3. **Pasteurization:** The fermentation caused by growth of living organisms and the activity of these organisms could be suppressed by heating the beverage.
4. This new knowledge helped reduce food poisoning.
   * 1. **Joseph Lister** developed the “antiseptic principle” in performing surgeries.

* It resulted in far fewer people dying of infection resulting from surgeries.
  + 1. Diseases such as typhoid, typhus, cholera, and yellow fever were now under control due to the improved availability of vaccines.
  1. **Dmitri Mendeleev** (1834-1907): He organized the rules of chemistry by devising the **periodic table** in 1869.
  2. **Electromagnetism: Michael Faraday** (1791-1867)
     1. His basic discoveries on electromagnetism in the 1830s and 1840s resulted in the first dynamo (generator).
     2. Generators were applied to the development of electric motors, electric lights, and electric streetcars.
  3. **August Comte** (1798-1857): father of “sociology”
     1. **Positivism:** All intellectual activity progresses through predictable stages; thus humans would soon discover the eternal laws of human relations through the study of sociology.
     2. Comte believed social scientists could help regulate society for the benefit of most everyone.
     3. Comte became the leader in the religion of science and the desire for rule by experts.
  4. **Charles Darwin**: ***On the Origin of Species by the Means of Natural Selection***, 1859
     1. **Theory of evolution**: All life had gradually evolved from a common ancestral origin in an unending “struggle for survival”; the species that were most able to adapt survived.
     2. Impact on religion: Darwin’s theory refuted the literal interpretation of the Bible (Book of Genesis).
* It created a crisis in some churches.
  + 1. Thomas Huxley became Darwin’s biggest supporter (“Darwin’s Bulldog”).
    2. **Social Darwinism**: **Herbert Spencer** applied Darwin’s ideas to human society.
       1. **“Survival of the fittest”**: natural laws dictated why certain people were successful and others were not.
       2. It was later used by imperialists to justify the conquest of “weaker” peoples.
       3. It was also used by major industrialists to justify their wealth while so many others struggled for subsistence.
       4. Spencer’s ideas were particularly popular among the upper-middle class.
  1. **Sigmund Freud** (1856-1939) – **Freudian Psychology**
     1. Considered one of the three giants of 19th-century thought (along with Darwin and Marx)
     2. In contrast to the rationalism of the Enlightenment, Freud believed that humans were largely irrational creatures.
        1. The human subconscious (the “ID”) was not subject to reason.
        2. Thus, people were not as in control of themselves as many liked to believe.
     3. Freud also emphasized that sexuality was a key driving force in one’s psychological make-up.
* Repressed sexual desires would lead to psychological problems.
  + 1. Freud was the founder of psychoanalysis.

1. He believed the hysteria of his patients originated in unhappy early childhood experiences where they had repressed strong feelings.
2. Under hypnosis or through the patient’s free association of ideas, the patient could be brought to understand his/her unhappiness and how to deal with it.
   1. The New Physics
      1. **Max Planck** (1858-1947)
         1. **Quantum mechanics**: subatomic energy is emitted in uneven little spurts called “quanta,” not in a steady stream, as previously thought.

* The laws governing the universe now seemed unpredictable at the atomic level.
  + - 1. Thus, matter and energy might be different forms of the same thing.
      2. It shook the foundations of 19th century physics that viewed atoms as the stable, indestructible building blocks of matter.
    1. **Marie Curie** (1867-1934) and Pierre Curie (1859-1906)
* They discovered the first radioactive element (radium) in 1910.
  + 1. **Albert Einstein** (1879-1955)

1. 1905, the **Theory of relativity** of time and space challenged traditional ideas of Newtonian physics.

* He theorized that time and space are relative to the viewpoint of the observer and only the speed of light is constant for all frames of reference in the universe.

1. The theory united an apparently infinite universe with the incredibly small, fast-moving subatomic world.

* **E = mc2**:Matter and energy are interchangeable; even a particle of matter contains enormous levels of potential energy.
  + 1. **Ernest Rutherford** (1871-1937)
* Split the atom in 1919: He postulated the structure of the atom with a positively charged nucleus and negatively charged electrons.
  1. Impact of new scientific theories on the European mind:
     1. Darwinism further challenged the Bible’s account of the creation of humans.
     2. Freudian psychology undermined the belief that humans were rational beings in control of their emotions.
     3. Impact of the New Physics:
        1. It shattered the popular belief that the universe could be easily explained via Newtonian physics.
* It challenged long-held ideas since Newton that all particles interacted based on gravitational force.
* Einstein’s theory of relativity now theorized that universal laws were “relative”—based on the position of the observer.
  + - 1. Scientists realized that they knew less about the universe than previously thought.
    1. This uncertainty later fed the pessimism of European society in the wake of World War I.

1. **Realism**
   1. Characteristics
      1. Belief that literature and art should depict life as it really was.
      2. It was largely a reaction to the failed Revolutions of 1848-49 and the subsequent loss of idealism.
   2. Realism in Literature
2. France saw the development of the realist movement

a. **Honoré de Balzac** (1799-1850): *The Human Comedy* depicts urban society as grasping, amoral, and brutal, characterized by a Darwinian struggle for wealth and power.

b. **Gustave Flaubert** (1821-1880): *Madame Bovary*

* Portrays the provincial middle class as petty, smug, and hypocritical

1. **Émile Zola** (1840-1902): giant of realist literature

* Portrayed the seamy, animalistic view of working-class life
* *Germinal* (1885)*:* Depicts the hard life of young miners in northern France

1. England:

a. **Charles Dickens** (1812-1870): *Hard Times*

* Portrays the grim life of workers in industrialized England.

b. **George Eliot** (Mary Ann Evans) (1819-1880) examined ways in which people are shaped by their social class as well as their own inner strivings, conflicts, and moral choices.

c. **Thomas Hardy** (1840-1928): *Tess of the d'Urbervilles*

* Portrayed a woman who was ostracized for having pre-marital sex

1. Russia: **Leo Tolstoy** (1828-1910) – greatest Russian realist

a. He had a fatalistic view of history but regarded love, trust, and everyday family ties as life’s enduring values.

b. *War and Peace* (1865-69) was his masterpiece.

* Story of Russian society during the Napoleonic wars

1. Scandinavia: **Henrik Ibsen** (1828-1906) – “father of modern drama”

* His plays examined the conditions of life and issues of morality, often at odds with the Victorian views of the day.

C. **Realism in Art**

1. Characteristics

a. The most important artists of the 19th century and 20th centuries created art for “art’s sake.”

* This included the Romantic period.
* Rather than depending on patrons to fund their works (e.g. the Church, nobles) artists exercised virtual artistic freedom and hoped to make their money by selling their paintings to the public.
  + This stook in stark contrast to the Renaissance or the Baroque periods where artists were commissioned by elites who specified what they wanted the art to look like.
* France was the center of the art world as artists sent their greatest works to the Paris Salon to be judged by a panel of distinguished figures from the art world.

b. France dominated the realist art movement.

c. Realists sought to portray life as it really was; not an idealized account.

* Ironically, many of the great realist works were rejected by the Salon for what was perceived to be mundane subject matter and crude artistic technique.

1. Ordinary people became the subject of numerous paintings within realist works.

2. **Gustave Courbet** (1819-1877)

a. He coined the term, “realism.”

b. ***The Stone Breakers****,* 1849: The painting shows two

workers breaking stones. It was groundbreaking as the

subject matter seemed extraordinarily trite. (*see right*)

3. **Francois Millet** (1814-1875)

* ***The Gleaners***, 1857: Depicts farm women gleaning the fields after the harvest (*see right*)

4. **Honore Daumier** (1808-1879)

* ***Third-Class Carriage****,* 1862: Depicts a grandmother, a daughter and her infant traveling on a railroad. This is a good example of how the railroad impacted the lives of peasants, making it possible for them to move or travel to cities. *(see next page)*

5. **Edgar Degas** (1834-1917)

* *Laundry Girls Ironing*, c. 1884: Depicts ordinary women performing unskilled labor (*see next page*)

6. **édouard Manet** (1832-1883)

a. French realist and impressionist painter who bridged both movements

b. Considered the first “modernist” painter

c. ***Le Déjeuner sur l'herbe*** *(Luncheon on the Grass),* 1863

* It shocked audiences by portraying a female nude and two male clothed companions in an everyday park setting. *(see next page)*

d. *Olympia* (1863) seemed equally revolting to the Salon for its casual nude portrayal of a prostitute