The Industrial Revolution

The Crystal Palace of London’s 1851 Great Exhibition.
1. What political, economic and social factors contributed to the Industrial Revolution starting in Britain?

2. What was the factory system? How did it impact the Industrial Revolution?

3. How did changes in transportation impact the course of development in the 19th century?

4. What were the social consequences of the Industrial Revolution? What actions were taken to resolve some of the negative social consequences?

5. What roles were played by women in the Industrial Revolution?
Causes of the Industrial Revolution in Britain

Journal 52/A: Without the transformation of farming by the English landowners, the Industrial Revolution probably could not have happened.

Directions: Using sentences or detailed bulleted notes, identify & explain the evidence Palmer uses to support the thesis listed above.
Causes of the Industrial Revolution in Britain

- **Agricultural Revolution**
  - **Enclosure Movement**
    - British parliament passed a series of laws allowing common grazing lands to be fenced off, preventing many British peasants from being able to graze their animals
    - migration: Enclosure movement led to many peasants migrating to cities where they became cheap labor for burgeoning factories
  
- **new Farming Technology & Techniques**
  - Jethro Tull’s Seed Drill (used to plant seeds in a mechanized way)
  - Andrew Meikle’s Threshing Machine (used in harvesting grains)
  - Development of “Four-Field System” (Norfolk Crop Rotation System) of crop rotation (ex., wheat, clover, barley & turnips) by Charles “Turnip” Townshend
Causes of the Industrial Revolution in Britain

- **Agricultural Revolution (cont’d)**
  - ✓ new crops
    - ➡ potato: high carbohydrate food that grew in just about any soil on the British Isles
    - ➡ maize (corn): fed to animals

- **population explosion: rapid increase in Britain’s population**
  - ✓ causes
    - ➡ end to plagues
    - ➡ Nutritional Revolution: people ate more and healthier food
    - ➡ improved medicine as a result of Scientific Revolution

- ✓ results: increased population increased demand for goods while driving down the value of labor
Causes of the Industrial Revolution in Britain

• Britain rich in natural resources
  ✓ mineral resources
    ➡ iron
    ➡ coal
  ✓ many navigable rivers
    ➡ Thames (London)
    ➡ Mersey (Liverpool)
  ✓ many good ports
    ➡ Liverpool
    ➡ London
    ➡ Bristol

Albert Docks, Liverpool, England
Causes of the Industrial Revolution

- Abraham Darby
  - English businessman and iron smelter
  - developed a method of producing pig iron (a type of iron) in a blast furnace that was fueled by coke
    - traditionally iron furnaces in Europe used charcoal, a fuel made from wood; charcoal was limited by the supply of trees
    - coke was a fuel produced by chemically decomposing coal; there was a large supply of coal in Britain
    - the use of coke allowed ironworks to increase their production of pig iron
  - Coalbrookdale (in Shropshire, England) became the center of the Darby family’s ironworks
  - impact of Abraham Darby
    - the ability to produce more iron less expensively drove what became known as the Industrial Revolution
    - iron was especially important in the production of steam engines, which would transform production and transportation in the Industrial Revolution
Causes of the Industrial Revolution in Britain

- development of the Factory System: replaced Domestic System of producing goods

✔ Domestic System
  ➡ traditional system of organizing labor and producing goods in pre-industrial Britain
  ➡ sometimes referred to as “putting-out” system
  ➡ workers, usually women, were subcontracted by an entrepreneur to produce textile goods on hand looms from their homes
  ➡ well suited to pre-urban times because workers did not have travel to another location for work and allowed women to balance agricultural and domestic chores with textile production

✔ Factory System
  ➡ labor was housed on one site (in a factory)
  ➡ factory was able to utilize power source (factory usually located near water) which allowed factories to have manufacturing equipment which, in turn, resulted in the faster production of goods that were less expensive to make
  ➡ factories built near rivers, canals, roads and, eventually, railways
  ➡ system of production well suited to urbanization
Causes of the Industrial Revolution in Britain

• Transportation Revolution

✓ canals
  ➡ canals connected Britain’s rivers into a vast waterway network (ex. Sankey Canal in northwest England near Liverpool)
  ➡ canals well suited to the transportation of fragile goods, like British porcelain

✓ roads and turnpikes
  ➡ Britain built the best roads since the Ancient Romans
  ➡ roads improved with the development of “Macadam” surface (layers of small stones held together by a cementing agent)
  ➡ many turnpikes charged tolls

John Loudon MacAdam
Causes of the Industrial Revolution in Britain

- **Transportation Revolution (cont’d)**

  ✓ **railways**

  ➡ impacted by development of steam engine (James Watt & Richard Trevithick)

  ➡ first celebrated railway line: “The Rocket” from Liverpool to Manchester (built by Robert Stephenson)

  ➡ revolutionized trade and travel in the 19th century

  ✓ **iron bridges, tunnels, viaducts, and steam-powered ships to connect transportation network**

Robert Stephenson
Causes of the Industrial Revolution in Britain

The Iron Bridge over the River Severn in Shropshire, England

AP European History • The Industrial Revolution • J.F. Walters & G.W. Whitton
Accomplishments of Isambard Kingdom Brunel

Box Tunnel of the Great Western Railway
built between 1836-41
Source: http://www.intriguing-history.com
Accomplishments of Isambard Kingdom Brunel

H.M.S. Great Britain
Completed 1843
Accomplishments of Isambard Kingdom Brunel

Clifton Suspension Bridge, Bristol, England
Completed in 1864 (after Brunel’s death)
Video Spotlight: The Impact of Steam Power & Locomotion
Video Spotlight: The Impact of Steam Power & Locomotion
Causes of the Industrial Revolution in Britain

- other factors
  - Britain had the world’s largest colonial empire
    - source of raw materials (ex., cotton from British India)
    - source of markets for British finished products (ex., cloth sold to British India)
  - well established banking system and stock market (centered in an area of London referred to by locals as “The City”)
  - Britain embraced “laissez-faire” economic philosophy
    - developed out of French Enlightenment along with Adam Smith’s “Wealth of Nations” (1776)
    - “laissez-faire” (leave it alone or hands-off): government should keep its hands off the economy; government should only be concerned with protecting citizens and building public infrastructure
    - factory owners and businessmen embraced what became known as laissez-faire capitalism
The Industrial Revolution in Britain

- **First Industrial Revolution**
  - **textiles (late 1700s/1800s)**
    - cotton & woolen textiles
    - center of the textile industry was in Oldham, Manchester in Lancashire County in Britain’s North West
  - **coal and iron (1700s/1800s)**
    - Northumberland Coalfield in northern England and South Wales Coalfield in southern Wales
    - development of “coke” in Coalbrookedale improved production of pig iron
  - **railways (early/mid 1880s)**
    - Brunel’s Great Western Railway
    - “Railway Mania” of the 1840s

- **Second Industrial Revolution**
  - **chemicals (mid/late 1800s)**
    - sodium carbonate: used in production of soap, glass, paper, etc.
    - sulphuric acid: used in bleaching of cloth, chemical fertilizers, etc.
  - **electricity (mid/late 1800s and into 1900s)**
    - telegraph (mid 19th century)
    - telephone (late 19th century)
    - London Underground: opened in 1863
    - electric streetlights: Blackpool was first in 1879
    - electric trams: Blackpool was first city in Britain to have them (1885)
Journal 52/B: Only a country like Britain, already wealthy from commerce and agriculture, could have been the first to industrialize.

—Palmer Chapter 52 • pp. 435-43—

Directions: Using sentences or detailed bulleted notes, identify & explain the evidence Palmer uses to support the thesis listed above.
Video Spotlight: The Great Exhibition (1851)
Social Consequences of the Industrial Revolution

Journal 52/C: For working people in Britain, the Industrial Revolution was a hard experience, but earlier conditions had been difficult also.

—Palmer Chapter 52 • pp. 435-43—

Directions: Using sentences or detailed bulleted notes, identify & explain the evidence Palmer uses to support the thesis listed above.
Social Consequences of the Industrial Revolution

• child labor

✓ background
  ➡ children employed in factories and mines, often due to their small physical stature and ability to perform tasks adults struggled to complete
  ➡ children were less expensive to hire
  ➡ parents needed the money and, therefore, had their children work
  ➡ no government regulation to prevent children from working
  ➡ most famous study of child labor in Britain: the Sadler Commission which issued the Sadler Report (1832) to parliament

✓ consequences
  ➡ children were often injured or killed in factories and mines
  ➡ disruption/destruction of childhood

✓ remedy: eventually governments established child labor legislation and countries adopted compulsory primary education
Recollections of a child laborer in a British textile mill:

“For several years after I began to work in the mill, the hours of labour at our works did not exceed ten in the day, winter and summer; and even with the labour of those hours, I shall never forget the fatigue I often felt before the day ended, and the anxiety of us all to be relieved from the unvarying and irksome toil we had gone through before we could obtain relief by such play and amusement as we resorted to when liberated from our work. I allude to this fact because it is not uncommon for persons to infer that, because the children who work in factories are seen to play like other children when they have time to do so, the labour is, therefore, light, and does not fatigue them. The reverse of this conclusion I know to be the truth. I know the effect that ten hours labour had on myself....”

Social Consequences of the Industrial Revolution

• long hours and dangerous working conditions

✓ background

➡ workers were often employed 12 hour shifts (or more!) for 6 days a week
➡ almost no safety features on machinery or in mines
➡ workers were not educated about or protected from toxic chemicals or dangerous working conditions
➡ no government regulation to monitor conditions or hours

✓ consequences

➡ exhaustion, injury, mutilation and death were common features of factory and mine life
➡ people had little time to spend with families or engage in leisure activities

✓ remedies

➡ eventually governments established legislation to regulate factories (ex., Britain’s series of Factory Acts)
➡ later trade unions were formed/legalized to lookout for the rights/needs of workers/miners
➡ eventually workers gained the right to vote (Britain in 1867)
Report of the owner of a textile factory, Lille, France:

“It is simply false to equate the hours of work in our factories with arduous work. My workers, for example, in principle put in ninety hours a week, but I am lucky to get seventy-two hours of work from them. They seize on any occasion to wander around the factory or even walk outside, and to chatter with each other. Sometimes I think that they do not know what work is, and can be made only to work against their will. Really, they are like children. I will admit only that my second generation of workers, who grew up in the factory, are somewhat more amenable....”

A report on Manchester textile workers by a medical doctor

“Prolonged and exhausting labour, continued from day to day, and from year to year, is not calculated to develop the intellectual or moral faculties of man. The dull routine of a ceaseless drudgery, in which the same mechanical process is incessantly repeated, resembles the torment of Sisyphus—toil, like the rock, recoils perpetually on the wearied operative. The mind gathers neither stores nor strength from the constant extension and retraction of the same muscles. The intellect slumbers in supine inertness;...To condemn man to such severity of toil is, in some measure, to cultivate him in the habits of an animal....”

Social Consequences of the Industrial Revolution

- **women entered workforce in large numbers**

  ✓ **background**
  
  ➡ traditional roles of women in rural Europe: helped manage farms, complete chores, rear children. Some women were employed in the “domestic system” of the textile industry. (ie, did not leave home to work)

  ➡ urbanization led to many women moving to cities with their families

  ✓ **consequences**

  ➡ many women took jobs in factories or in the domestic service industry to add to the family income; long hours were the norm

  ➡ women had the “dual burden” of maintaining traditional roles while also holding down a full-time job away from the home

  ➡ as an economic and social necessity, many children had to take jobs in factories or mines

  ✓ **remedies/results**

  ➡ Parliamentary reform: government action limiting the number of hours a worker could work and child labor laws helped lessen some of industrial life

  ➡ “dual burden” remained a reality as social conventions were slow to change to adopt to women working outside the home
Social Consequences of the Industrial Revolution

- urbanization & crowded cities

✓ background

⇒ millions of workers moved from the countryside to cities in the course of the early Industrial Revolution (ex., Manchester in Britain)

⇒ Britain became world’s first urbanized society by the middle of the 19th century

✓ consequences

⇒ living conditions were crowded and unsanitary as unregulated slum housing (exs., Old Nichol in London and The Gorbals in Glasgow, Scotland) was quickly built to meet demand

⇒ major shortages of fresh drinking water

⇒ sewage systems inadequate to deal with urban society; ventilation and air quality poor

⇒ disease (ex., cholera) and fire spread quickly as living conditions were often atrocious

✓ remedies

⇒ government began to regulate cities and build infrastructure to address pressures of urban society

⇒ cities began to hire “city planners” to make cities safer, more functional, more beautiful and to minimize threat of revolts (ex., Paris)
The Great Stink: Reflections On

“In the summer of 1858 London suffered a combination of heatwave and drought in which [human] waste accumulated and wasn’t washed away. Temperatures soared into the nineties and stayed there—an unusual condition for London. The result was ‘the Great Stink, as *The Times* dubbed it. The Thames grew so noxious that almost no one could bear to be near it. ‘Whoso once inhales the stink can never forget it,’ wrote one newspaper. The curtains of the new Houses of Parliament were drawn tight and doused in a solution of chloride of lime to mitigate the lethal smells, but the result was something like panic. Parliament had to be suspended. Some members, according to Stephen Halliday, tried to venture into the library, overlooking the river, but ‘they were instantaneously driven to retreat, each man with a handkerchief to his nose.’

Video Spotlight: Urbanization, Joseph Bazalgette & “The Great Stink”
Reactions to Social Consequences of Industrial Revolution

- government reform (especially in Britain)
  - ✓ child labor laws
  - ✓ laws limited the number of hours that could be worked in a day
  - ✓ laws passed making factories safer (relatively!)
  - ✓ governments eventually established compulsory education
  - ✓ some governments allowed workers to vote (Britain, 1867)

- labor unions: in some countries, workers were allowed to form unions to collectively bargain for higher wages and better working conditions (ex., Britain)

- alternative political/economic philosophies
  - ✓ socialism: government control of major industries and services
  - ✓ Utopian socialism: planned communities (ex., Robert Owen in Britain)
  - ✓ Marx’s communism: no private property and workers share profits
Collective Action of British Workers: Luddism

• background

✓ tough economic climate of late-Napoleonic Wars Britain (c. 1812)
✓ installation of mechanized (automated) looms in textile factories; the new looms could be operated by unskilled labor

• Luddite movement

✓ many skilled textiles workers lost jobs in the hard economic climate; the textile workers contended that the new mechanized textile equipment made their jobs redundant (ie, their skilled labor was not needed)
✓ textile workers broke into factories and smashed the new textile equipment in places like Lancashire and Yorkshire; they were referred to as “machine breakers”
✓ some textiles mills were burned and one mill owner was assassinated
✓ the machine breakers came to be known as Luddites because they were “led” by “General Ned Ludd,” a mythical figure who allegedly looked after the workers

• results of Luddism

✓ British government eventually passed a law making the destruction of industrial machinery a capital offense
✓ many leading Luddites were put on trial (ex., York, 1812) and found guilty: some were executed while others were exiled to the penal colony of Australia
✓ Luddism influenced and inspired workers to collectively respond in the future; pressure from workers would eventually force the British government to make incremental changes to redress the grievances of workers because the government feared the outbreak of violent revolution (the French Revolution was not far from their minds)
Collective Action of British Workers: Luddism

Luddites at work

The mythical “General Ludd”
Collective Action of British Workers: Swing Riots

- **background**
  - ✓ the mechanization of agricultural work (ex., threshing machine which separated grain from stalks & husks) during the Agricultural and Industrial Revolutions contributed to a steady decline in the wages of unskilled agricultural workers
  - ✓ rising bread prices resulting from the Corn Laws (1815), which kept grain prices artificially high by placing restrictions on cheaper foreign grain, contributed to hunger and famine in Britain
  - ✓ weaknesses in Britain’s Poor Law system, which was failing to meet the needs of England’s rural poor (such as under- or unemployed agricultural workers)

- **Swing Riots (1830)**
  - ✓ unemployed agricultural workers destroyed threshing machines and other agricultural machinery, mostly in the south of England; workers also burned ricks (hay stacks) and maimed farm animals
  - ✓ rioters often left behind a note signed “Captain Swing,” a mythical figure (like “General Ludd” from the Luddite movement)

- **results of Swing Riots (1830)**
  - ✓ many rioters were put on trial, found guilty and either executed or exiled to the penal colony of Australia
  - ✓ fearing a revolution like the one in France (most recently the July Revolution of 1830), some farmers and landlords agreed to raise wages for agricultural workers
  - ✓ pressure mounted on the British government to initiate political reform, which eventually led to the Reform Bill of 1832 (which expanded the franchise to include middle class males)
  - ✓ influenced the passage of the New Poor Law (1834), which established work houses to help alleviate rural poverty
Collective Action of British Workers: Rebecca Riots

- **background**
  - poverty and hunger in Wales, made worse by crop failures in the late 1830s and early 1840s (sometimes known as the “Hungry ‘40s” in Britain) and the continued negative impact of the Corn Laws

  - agricultural workers felt they were being unfairly taxed, especially on toll roads (turnpikes) which the farmers used for carting fertilizer to their fields

- **Rebecca Riots (1839-42)**
  - male workers—often dressed as women—attacked toll-gates (places where tolls were collected for use of turnpikes)

  - rioters often read a biblical passage (pertaining to Rebecca) and/or held a mock trial prior to destroying the toll-gates

- **results of Rebecca Riots**
  - riots eventually stopped because of increased troop presence in Wales, the redress of some worker grievances and criminal groups carrying out their illegal activities under the guise of “Rebecca rioters”

  - led to some reforms in how and where tolls were collected on turnpikes

  - contributed to the precarious political and social climate that eventually led to the repeal of the Corn Laws
Collective Action of British Workers: Chartism

- background
  - growth of industrial capitalism and urbanization in Britain in the 19th century
  - failure of the working class to gain the right to vote with the Great Reform Bill of 1832 (which had extended the franchise to middle class men)

- People’s Charter of 1838: document led to them being called “Chartists”
  - issued by the six members of Parliament and six working class men led by William Lovett of the London Working Men’s Association and Ireland’s Feargus O'Connor
  - called for six main demands
    - right to vote for all men aged 21 and older
    - adoption of the secret ballot
    - no property requirement to be a member of Parliament
    - pay for members of Parliament (so members of the working class could run for office)
    - equal constituencies
    - annual parliamentary elections
Collective Action of British Workers: Chartism

- **The Chartist Movement (1838-48)**
  - Chartist demands were popular among working class
  - Chartist organized a demonstration in Lancashire (1838)
  - Chartist held a convention in London and Birmingham (1839)
  - Chartist demands were submitted to Parliament, but they were rejected
  - Rejection by Parliament led to violent outbreaks and rioting
  - Chartist submitted a petition to Parliament with over 3 million signatures (1842); it, too, was rejected by Parliament
  - Chartist participated in, and in some cases led, strikes across Britain
  - Many Chartist were eventually arrested and tried; some were exiled to Australia
  - Chartist submitted another petition in 1848 (with less signatures), but it was, once again, rejected
  - Parliament passed laws banning public meetings and created new laws on sedition and treason
“In the event, the rally fizzled out, partly because the Chartists’ leader, Feargus O’Connor, was beginning to behave bizarrely from an as-yet-undiagnosed case of syphilitic dementia (for which he would be committed to an asylum the following year), partly because most of the participants weren’t really revolutionaries at heart and didn’t wish to cause or be part of a lot of bloodshed, and partly because a timely downpour made retiring to a pub suddenly seem a more attractive option than storming Parliament. The Times decided that the ‘London mob, though neither heroic, nor poetical, nor patriotic, nor enlightened, nor clean, is a comparatively good-natured body,’ and, however patronizing, that was about right.”

Collective Action of British Workers: Chartism

- The decline of the Chartist movement
  - Chartists often disagreed on demands and course of action
  - Parliament passed the Mines Act (1842) and the Ten Hours Act (1847), improving conditions for workers (which resulted in many workers having less grievances and, therefore, less reason to support the Chartists)
  - Government authorities successfully quelled Chartists riots and strikes
  - Chartist demands received little support from business owners

- Legacy of the Chartists
  - Chartism was Europe’s first mass working class movement
  - Although the Chartists managed to secure none of their initial six demands by 1850, eventually all of the demands except one (annual elections to Parliament) would be passed by Parliament even though the Chartists ceased to exist as a working class movement
  - British workers would eventually form labor unions in order to redress their grievances and campaign through legitimate political parties (ex., Labour Party, founded c. 1900) once working class men gained the right to vote in 1867
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• Wikipedia.com (en.wikipedia.com).