Journal:
• Complete the chart on technological inventions:

<table>
<thead>
<tr>
<th>Modern day invention:</th>
<th>What life was like before it:</th>
<th>What has changed because of it:</th>
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</thead>
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• The greatly increased output of machine-made goods that began in England in the mid 1700’s.
• Prior to the Industrial Revolution, people made things by hand.

The Industrial Revolution

What led to this Industrial Revolution? Things became more scientific!

• New agricultural methods increased crop yields.
• Jethro Tull: Scattering seeds was wasteful. Invented the seed drill in 1701. Well spaced rows at specific depth.
• Crop rotation
• Improvements in livestock breeding (better animals)
• The commercial revolution increased trade between Europe and the Middle East, Africa, India, and China, but they were skilled at manufacturing, so Europeans lost business
  • Europe needed an advantage over them
• The Industrial Revolution in Europe changed the way they manufactured goods, from human labor to machines. This increased efficiency (more speed, less waste), so now Europe had an advantage over other places

Before the Industrial Revolution

Why did the Industrial Revolution Begin in England?

• Large population of workers due in part to the enclosure movement
• Extensive natural resources:
  – Water power and coal to fuel machines
  – Iron ore to construct machines
  – Rivers for inland transportation
  – Harbors for merchant ships
  – Growing banking system – gave loans to new businesses.
  – Political stability
  – Natural resources from colonies to make goods

During the Industrial Revolution
Britain had all the Factors of Production:

- **Factors of Production:**
  - The resources needed to produce goods and services that the Industrial Revolution required.
  - Land
  - Labor
  - Capital (wealth)

- **Inventions Spur Industrialization: Textile Industry**
  1. 1733 – shuttle on wheels. Doubled the work a weaver could do in a day.
  2. 1764 – Spinning Jenny spinning wheel. One spinner could work on 8 threads.
  3. 1769 – Water frame. Used water to power spinning wheels.
  4. 1779 – Spinning mule. Made thread stronger and more consistent.
  5. 1787 – Power loom. Sped up weaving.
  6. 1793 – Cotton Gin. Multiplied the amount of cotton that could be cleaned.

Discuss!

- What does the progression of the textile industry show us about industrialization?

Capitalism

- An economic system based on the *free-market*: people and businesses must be free to buy and sell what they want, however they want it
- People are allowed to own *private property* – however much they want
- Prices are determined by how much supply there is of a product and how much people demand to buy it
Adam Smith

- An English philosopher
- Developed the theory of “laissez faire” which means that a capitalist economy should not be ruled by the government
- Instead, every person and business should be allowed to buy and sell whatever they want, get whatever job they want, and their self-interest will make the economy grow.

Discuss!

- What is good about capitalism/laissez faire?
- What is not so good?
- How do you think these ideas spurred on industrialization?

Factories

- Water frame, the spinning mule, and the power loom were bulky and expensive machines.
- They took the work of spinning and weaving out of the house.
- Wealthy textile merchants set up the machines in large buildings called factories.
- First factories were built near rivers because they needed water power.
Advancements in Transportation

Watt’s Steam Engine

• James Watt
• 1765
• Worked for 2 years to find a way to make a steam engine work faster and more efficiently.
• In 1774 he joined with a businessman named Matthew Boulton who paid him a salary to build a better engine.

Water Transportation

• Robert Fulton – Ordered a steam engine from Watt and used it to create a steam boat.
• Made a boat called the Clermont, which made its first successful trip down the Hudson River

Canals in England

• Created a network of canals (human-made waterways)
• Made it much easier and less expensive to transport goods and raw materials.
Road Transportation

- John McAdam – equipped road beds with a layer of large stones for drainage.
- On top he put a layer of crushed rock.
- Even in the rain, heavy wagons could now travel without sinking in the mud!
- Private investors then formed companies that made roads and operated them for profit. Called “turnpikes”

Railway Age Begins

- Steam engine on wheels!
- 1804
- Richard Trevithick – Engineer
- First to create and hauled 10 tons of iron nearly 10 miles on a track with a steam-driven locomotive.
- Many British Engineers built improved versions of Trevithick’s locomotive.

First Railroads Emerge

1. 1825 - 27 mile line from Yorkshire coal fields to the Port of Stockton.
2. 1829 – Railway connected the Port of Liverpool with the city of Manchester.

Effects of the Locomotive

1. Spurred Economic Growth – cheaper to transport goods
2. Railroad boom created thousands of jobs. (Railroad workers and miners)
3. Boosted agricultural and fishing industries – they could transport their goods to distant cities.
4. Made travel easier – encouraged people to take jobs further away from home.
### Industrialization Changes Life

- People could earn higher wages in factories than on farms.
- More money helped people heat homes, eat well and wear nicer clothing.
- Cities swelled with waves of job seekers.

### Industrial Cities Rise

- Manufacturing of goods was concentrated in a central location.
- Population in cities more than doubled, some even quadrupled.
- Period was known as Urbanization – City building and the movement of people to cities.

### Where did cities develop?

- Cities developed around factories.
- Factories developed in clusters.
- Entrepreneurs built them near sources of energy (water, coal mines)

### Cities Grow Too Fast

- Cities had no development plans, sanitary codes or building codes.
- People lacked adequate housing, education or police protection.
- Unpaved streets had no drains – garbage collected in heaps on them.
Living Conditions

- Factory workers lived in dark, dirty shelters.
- Whole families crowded into one bedroom.
- Sickness spread.
- Cholera swept through slums.
- 1842 – Lifespan for working class people in city = 17 years. In rural areas = 38 years.
Working Conditions

- 14-16 hour shifts
- 6 days per week
- Factories not well lit
- Machines injured workers
- Injured workers get no help from government.
- Coal mines – most dangerous.
  - Frequent accidents
  - Damp
  - Shorter lifespan
  - Women and children took jobs because they were cheaper labor.
Child labor, poor living and working conditions, and tension between the classes! Oh my! How can all these problems be fixed?
Karl Marx and Frederic Engels

- German philosophers
- Recognized that all human history was a struggle between the rich (the haves) and the poor (the have-nots)
- They saw that the rich (the bourgeoisie) were more successful if they exploited and harmed the workers (the proletariat).

Marx and Engels' Solution

- 1) Socialism: a market economy where the government plays a very big role by making laws for businesses, owning certain necessary industries, and protecting workers' rights
- 2) Communism: the government owns the forces of production in an economy (land, energy, infrastructure, resources). They control people's jobs, prices for products, which products can be bought and sold, and anything else the government thinks is necessary.

Discuss!

- What would you be? A socialist, communist or capitalist?
- Why?
Positive Effects of Industrialization

- Job creation
- Increased wealth
- Technological innovation
- Increased production and availability of goods.
- Increased educational opportunities.
- Improved housing.
- Gradual improvement in quality of life for all.