Advancements of the Industrial Revolution
I. Water used to power machines
   A. *entrepreneurs* built factories near rivers to use for power for machines
   B. machines powered by water needed less *manpower* for production
   C. because less men were needed to do work, it cost less to make products
   D. because it cost less to make products, products were cheaper
      1. this meant more people could buy more products
II. Steam used to power machines  
A. steam engine was **IMPROVED** by James Watt  
1. steam engines became more efficient (able to get more work done in less time)
III. Coal became a new source of power for machines
   A. machines used a lot of wood in the fire that was needed to boil water to create steam
      1. running out of wood became a new problem in England
   B. coal became the fuel of the Industrial Revolution because it burns hotter and longer than wood
      1. used COKING as a process used to change coal into coke – necessary for making iron (metal)
IV. New inventions

A. Eli Whitney invented the “cotton gin”
   1. took the seeds out of cotton so no cotton was wasted in the process
   2. process of preparing cotton to make thread became easier and production increased
B. Henry Bessemer invented a new furnace (oven) and process for making steel
   1. necessary for making taller buildings because it was stronger and could hold more weight
C. Louis Pasteur invented a new way to process milk to remove bacteria from it that would cause sickness
   1. new process called “pasteurization”
   2. new process of treating milk greatly improved health
D. Thomas Edison invented a long-lasting light bulb that used electricity
   1. new light bulb allowed factories to stay open 24 hours a day
V. Transportation

A. Need for better transportation
   1. Increase in production increased need to transport goods
   2. Pre-industrial society used horses, mules, and dirt roads

B. Inventions
   1. Stone roads, later asphalt roads
   2. Canals
   3. Transportation era started with “The Rocket” (1829)

C. Effects of railroads
   1. Expanded rapidly throughout England
   2. Cheaper transportation increased production
   3. Railroads fueled other industries: coal, steam engines, iron, steel, manufactured products
The Growth of Railways in Great Britain, 1840 and 1850
The Extension of the Railway System in England and Wales, 1845-1914

1845

1854

Rail Lines

1876

1914