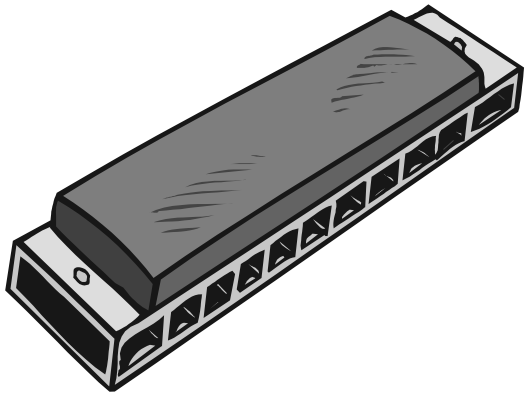


Student Worksheets
~for~
The Industrial Revolution
The Growth of America's
Production System
Grades 6-8

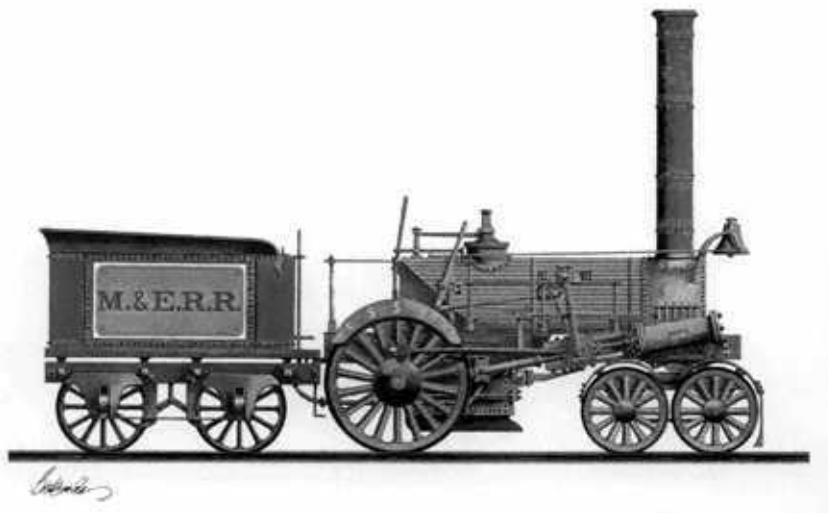
These activity sheets are for students while studying the unit on the Industrial Revolution. You can adjust, change, or alter any of these activities to fit your needs.

INVENTIONS

Mystery Inventions



What famous person invented this?



Who is responsible for this invention?

WHAT IS A REVOLUTION?

Think about it:

- During the American Revolution, America declared its independence from England and became its own country.
- During the French Revolution, the King and his entire court were beheaded because the people wanted a say in the government that ruled them.
- Why did they call the Industrial Age a Revolution?

Help from the Dictionary: A sudden or momentous change in a situation.

WHAT CAUSED THE AMERICAN INDUSTRIAL REVOLUTION?

In the 1800s after their independence from England, America saw the need to become less dependent on England and Europe. England wanted America to remain dependent on them. America shipped them cotton and they manufactured it into cloth and sent it back. Anyone who worked in a factory was not allowed to leave the country. England planned to keep the technology and not share. Americans offered a large reward for anyone who could build a factory in this country. A brave man with a photographic memory took on the task. Samuel Slater memorized everything in the factory, quit his job, and moved to London where he worked doing manual labor. He didn't tell anyone he used to work in the factory. He caught a ship to America and built the first factory on a stream in Rhode Island.

It is interesting that as soon as an idea becomes reality, someone else has already thought of a way to improve it. In the 1800s there were so many ideas and improvements on those ideas, it was like a revolution—a big dramatic change in the way things were.

FAMOUS INVENTORS

Gordon McKay and Lyman Blake
Cyrus H. McCormick
Elisha Grave Otis
Alexander Graham Bell
James Oliver
Randolph Diesel

Activity One:

Choose an American invention of the 1800s. Conduct research in the library and/or the Internet as well as other sources.

Find out:

- Who invented it? When it was invented? Where it was invented? What impact this invention had on American history?
- Remember to document your sources: write a bibliography as you search.
- Design a poster that will advertise your invention. It must contain all of the information, and it must catch the viewers' attention with color and pictures.

The class will compile these into an Invention Slide Show. You will moderate your portion of the slide show. Your speech must be one minute in length.

Websites that will help your research

A Science Odyssey: People and Discoveries Technology—
<http://www.pbs.org/wgbh/aso/databank/tech.html>

A&E Biographies on Cyrus McCormick—
http://search.biography.com/print_record.pl?id=17477

Who's Who in American History—
<http://hum.1ss.wisc.edu/hist102/bios/8.html>

National Inventors Hall of Fame—<http://inventors.tqn.com/msub5.htm>

Activity Two:

WHAT REVOLUTION ARE WE GOING THROUGH NOW?

Think about it:

What big changes are happening now? Try this website:
<http://www.pbs.org/wgbh/aso/tryit/techslider.html>

- Interview your parents or another adult about life when they were your age.
- Write ten open-ended questions about what modern conveniences they had or didn't have compared to what you have now.
- Interview them. Report to the class your findings
- For EXTRA CREDIT interview your grandparents or great grandparents!

HORRORS OF THE WORKPLACE

THE REVOLUTION COMES TO AMERICA

When the Industrial Revolution came to the United States, several swore not to copy the English who had a permanent underclass living in wretched conditions. Francis Cabot Lowell tried to set the stage in Massachusetts. Lowell built a factory that spun cotton into thread **and** wove it into cloth by machine. He was as much concerned with the well being of his workers as well as his profits. He was set on not using children and poor families. He hired young girls from the surrounding farms, housed them in nice dormitories, built them a church and paid them fairly for the work they did in his mill. Some of the girls were even able to send money home to help their parents back on the farm. While the Lowell System of hiring workers did work, it did not catch on.

THE BEGINNING OF CHILD LABOR

In Rhode Island, Samuel Slater's factory opened by hiring 7 boys and 2 girls between the ages of 7 and 12 to run his spinning machines. They could be hired much cheaper than men. They received between 33 and 67 cents per week, while adult workers in Rhode Island were earning between \$2 and \$3 a week. By 1820 one-half of Rhode Island's factory workers were children. As factories and mines spread across the east coast, owners began hiring more and more children.

Children worked in many industries, like textile mills, tobacco factories, and garment workshops.

By 1900, there were close to 2 million children under the age of 15 working throughout the country.

WORKING CONDITIONS

- Workers: In the 1840's as factories replaced the textile mills. The workers were primarily women and children, and very often, entire families worked in factories together. Every family member's earnings helped the family survive.
- Hours: The factory workers began their day at 4:00 a.m., and it ended at 7:30 p.m. They were allowed one break at 7:30 a.m. for breakfast, and another at noon for lunch.
- Conditions:
 - Factories often had no windows to allow for ventilation, or heating systems to help the workers stay warm in the winter.
 - Poor lighting led to accidents.
 - Machines crushed workers hands and arms, because there were no safety devices on them.
 - Textile workers got lung diseases from breathing dust and fiber all day.
 - Steel workers risked injuries working close to red-hot vats of melted steel.
 - In mines, cave-ins buried miners alive.
 - If a worker got hurt, they were fired.
 - There was no such thing as insurance.

Workers felt lucky because they had a job!

LIFE IN THE CITY

In the cities of the 1800's, poor people lived in the oldest part of the city, near the downtown district. The middle class lived farther out in neat row houses or new apartment buildings. Beyond them, lived the rich. They lived in large homes with big lawns that had lots of trees.

Some of today's companies that have been accused of profiting from abused labor:

Nike
Disney
Hyundai
Guess
Wal-Mart
Kmart
J.C.Penny
Victoria Secret/Limited
Espirit

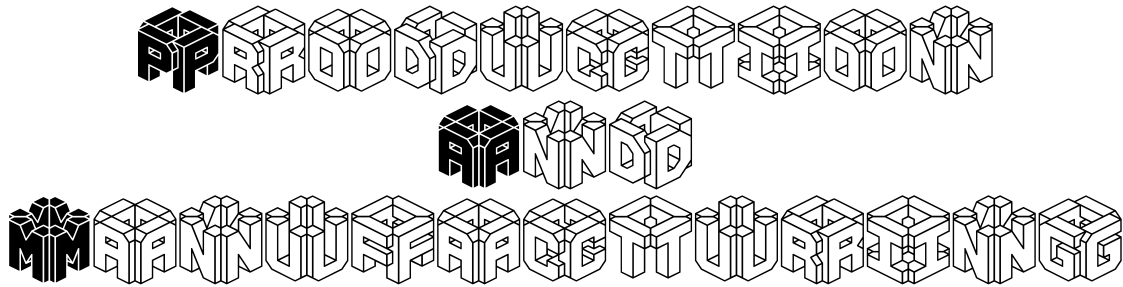
CBS aired a special "48 Hours" television program on Nike's factory operations in Vietnam. The transcript for the broadcast is available at:
<http://www.saigon.com/~nike/48hrfmt.htm>

According to the report, fifteen Vietnamese women told CBS News that they were hit over the head by their supervisors for poor sewing. Two were sent to the hospital afterward. Forty-five women were forced by their supervisors to kneel down with their hands up in the air for 25 minutes.

June 1996 *Life* magazine photo essay detailed the use of child labor in Nike's Pakistan soccer ball factories.

The problem of child labor is, in fact, nothing new. Early in this century, the extensive use of child labor was a fact of life here in the United States as Americans continued to convert from an agricultural to an industrial economy. However, the exploitation of children as workers exists as a major problem in many parts of the world. Estimates by human rights experts reveal that as many as 400 million children under the age of 15 are performing forced labor. Because these children are paid little and do not receive an education, they have little chance of breaking the cycle of poverty.

The child labor problem is predominantly confined to under-developed countries. The economic reality is that children are typically paid one-half to one-third what is paid to adults doing comparable work. In addition to low pay, the children are often exposed to significant health hazards and subjected to extreme physical, verbal and even sexual abuse. While many children work to add to their family's income, others are literally sold into bondage by their parents in return for cash or some form of credit.



Interchangeable Parts

In the early 1800's, Eli Whitney came up with an idea that had a great impact on the way goods were produced.

Before his idea of interchangeable parts, skilled workers who made each item by hand from start to finish produced most goods. For example, a gunsmith worked long and hard on each gun he made. First the stock was made, then the barrel, and also the trigger. Each gun came out a little different, so if a part on a gun broke, the gunsmith would have to make a new part for that particular gun. This took a lot of time.

Whitney's idea was to build a machine that made each separate part of the gun. That way, all the parts would be exactly alike. Each barrel would be the same length, and stocks would be the same size and shape. If something broke, it could be easily replaced.

Whitney's idea of interchangeable parts made it possible to put together and repair things quickly. This idea began with guns but soon spread to other industries.

The Assembly Line

In 1913, Henry Ford introduced the idea of the assembly line. In his automobile factory, he had an assembly line where the frame of each car moved along on a moving belt. Workers on each side of the belt added parts to the car. This allowed Ford to make cars faster. He was then able to sell them for less than his competitors.

Scientific Management

Many of the factories in the early 20th century operated under the philosophy of scientific management. Frederick Winslow Taylor, an American industrial engineer, made this theory popular. Taylor believed that workers should be hired to perform a small number of tasks, in a repetitive manner.

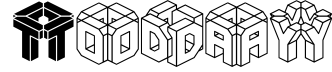
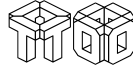
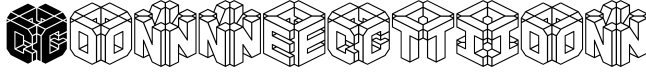
Scientific management principles discouraged workers from working more effectively and efficiently. The theory was that workers would definitely make mistakes, but inspectors would catch these at the end of the assembly line. Workers could then be

docked for faulty workmanship. If a worker made too many mistakes, they could be fired.

This same method made its way into the public schools at the turn of the century.

Total Quality

William Edwards Deming is the person who popularized the Total Quality Philosophy. He felt that the Taylor method of scientific management was degrading to the human spirit. He thought that workers could be trained to conduct their own quality controls. Deming believed that if workers were trained and empowered to manage their own work processes, the quality of their output would increase. If workers could do this, then the inspectors at the end of the line would be unnecessary. Therefore, total quality would lower manufacturing costs.



Think about business. What type of production system are they using?

1. McDonald's
2. Subway
3. Pizza Hut
4. AM General-the Hummer plant
5. Saturn Automobiles [**website: <http://www.saturn.com>**]