Science and Technology During the Industrial Revolution

Select lesson plans that most directly support The Henry Ford's educational theme "Science and Technology"

Created by participants in the
National Endowment for the Humanities
Landmarks of American History and Culture Workshops
for School Teachers:
America's Industrial Revolution at The Henry Ford,
2009, 2010, 2011

America's Greatest History Attraction

Elementary Lesson Plan 1

Deborah Limage, Carstens School, Detroit, MI

Title of Lesson: Changing Lifestyles

Grade Level: 4-5

Overview: Students will compare lifestyles of people from the mid 18th - 19th century to current lifestyles of the early 21st century

Central Question: Have people used technology to improve the way they work?

Learning Objective: Students will be able to compare and contrast technology from the past to the technology used today. Students will also be able to "invent" or improve "old" technology to meet the demands of the future.

Assessment Tools: A chart noting the technology used in the past to technology used today. This chart should also show improvements made to this technology to meet the demands for the future.

Key Concepts: Technology, Efficiency, Growth, Invention, Innovation, Compare/contrast

Evidence/Sources: The United States (grade 5 textbook), Scott Foresman, 2008, pp. 200-229, 536-558, 560-592

Regions: Adventures in Time and Space (grade 4 textbook), Macmillan/McGraw-Hill, 1997, pp. 228-237, 260-263, 320-325, 326-327,

Cowan, Ruth Schwartz, "More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microware" (New York: Basic Books, 1983) pp. 3-75.

Larkin, Jack, "The Reshaping of Everyday Life 1790-1840" (New York: Harper, 1989) pp. 1-61.

Site Exploration: Daggett Farm: a 1760's Connecticut farmstead in which students will experience spinning, weaving and sewing and discuss issues from the perspective of a yeoman farm family.

Susquehanna Plantation: an 1850's Maryland tobacco plantation worked by 50 slaves.

Hermitage Plantation Slave Quarters: Students will investigate the cultural lives of enslaved African Americans.

Firestone Farm: an 1880's farm where students will study farming tools.

Mattox Family Home: During the Great Depression, Amos Mattox worked as a farmer, shoe maker, and preacher during the 1880's.

Time Frame: Two days (including a trip to Greenfield Village)

Instructional Sequence: Using the following concept words, students should give a definition (using their own words) and an example for each - Technology, Efficiency, growth, invention, and innovation

Students, in groups, should brainstorm for the different types of technology we use today. Students should also describe the uses for each. (For example: microwave oven, high definition television…)

Students will begin completing the chart: "Technology for the Past and Present".

A. Before visiting Greenfield Village (GFV): Students should develop a list of examples of technology used today. This list should be listed under the column labeled "Present". For example, this list could include microwave under "cooking" or television under "entertainment".
B. While visiting GFV, students will visit Daggett Farmhouse, Susquehanna Plantation, The Hermitage, Firestone House, and The Mattox Family Home and match-up the various types of technology they see at these locations with the technology they labeled in the "Present" column.
C. After visiting GFV, students will compare/contrast the technology labeled under the "Past" and "Present" columns and think of how these technologies have changed over the years. Using the "Future" column, students should imagine how these technologies could evolve or improve for future uses.

Student Project Idea: With partners, students should design a home of the future illustrating technology labeled under "Future" on their chart. This home should include all categories listed on this chart.

Anticipated challenges: Students may have a difficult time "imagining" future situations for inventing or improving existing technology. A possible solution for overcoming this hurdles may be to examine existing technology and its reasons for need then projecting this method toward forcasting future concerns and looking for solutions for these concerns.

Students oftentimes want to "invent" fantastical solutions to every day problems. For example, them may envision super robots or teleporting. A possible solution to this dilema may be to envision "real-life" solutions to "real-life problems. For example: a "real-life" problem may be high traffic. A possible solution may be inventing a bullet-speed mass transit system.

Curriculum Links: Michigan Grade Level Content Expectations Grade 4:

4-H3.0.1 Use historical inquiry questions to investigate the developoment of Michigan's major economic activities (agricultural, mining,manufacturing,lumbering, tourism, technology, and research) from statehood to present. What happened? When did it happen? What was involved? How and why did it happen? How does it relate to other events or issues in the past, in the present,

4-H3.0.4 Draw upon stories, photos, artifacts, and other primary sources to compare the life of people in towns, and cities in Michigan and in the Great Lakes region during a variety of time periods from 1837-1900.

4-H3.0.5 Use visual data and informational text or primary accounts to compare a major Michigan economic activity today with that same or a related activity in the past.

4-G4.0.2 Describe the impact of immigration to the United States on the cultural development of different places or regions of the United States (e.g., forms of shelter, language, food).

Michigan Grade Level Content Expectations Grade 5:

5-U2.3.2 Describe the daily life of people living in the New England, Middle, and Southern colonies.

5-U2.3.3 Describe colonial life in America from the perspectives of at least three different different groups of people (e.g., wealthy landowners, farmer, merchants, indentured servants, laborers and the poor, women, enslaved people, free Africans, and American Indians).

5-U2.3.4 Describe the development of the emerging labor force in the colonies (e.g., cash crop farming, slavery, indentured servants).

5-U2.3.5 Make generalizations about the reasons for regional differences in colonial America.

5-U3.1.8 Identify a problem confronting people in the colonies, identify alternative choices for addressing the problem with possible consequences, and describe the course of action taken.

Technology for the Past and Present

1. Before visiting Greenfield Village (GFV): Students should develop of list of examples of technology use today. This list should be listed under "Present".
2. While visiting GFV, students will visit Daggett Farmhouse, "Susquehanna Plantation, The Hermitage, Firestone House, and The Mattox Family Home and match-up the various types of technology they see at these locations with the technology they labeled in the "Present" column.
3. After visiting GFV, students will compare/contrast the technology labeled under the "Past" and "Present" columns and think of how these technologies could evolve or improve for future uses.

TECHNOLOGY	PAST	PRESENT	FUTURE
Cooling 			
Cooking 			
Heating 			
Sleeping 			
Washing Clothes 			
Entertainment 			
Communication 			

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Elementary Lesson Plan 2

Lisa Koski, Trillium Academy, Taylor, MI

Title of the Lesson: Simple Machines in the Industrial Revolution

Grade Level: K-3

Overview: Students will learn about simple machines by viewing and discussing a PowerPoint presentation. Once introduced, the students will match photographs of machines to the simple machine vocabulary word.

Central Question: How have simple machines helped to make work easier before, during and after the Industrial Revolution?

Assessment Tools: See attached rubric and KWL chart.

Key Concepts: Simple machines, work, effort

Evidence Sources: See attached teacher-created PowerPoint and images, www.edheads.org.

Time Frame: Lesson can be taught in 3-5 30 minute sessions, not including culmination field trip to *Greenfield Village.*

Instructional Sequence: Day One: 1. As a group, fill out the "K" section in the K-W-L chart to find out what the students already know about simple machines.
2. Continue the chart into the 2nd section, the "W" to find out what they would like to learn about simple machines.
Day Two: Show and discuss teacher-created PowerPoint. Ask students to name simple machines in their home and school. Teacher may have students take notes during the presentation and discussion (see attached template).
Day Three: Students will play a matching game with photos of simple machines and vocabulary cards. The teacher may have this as a center, in which case, only one set needs to be made. Each small group needs to have their own set of cards and photos. To make the game easy, make 6 photo cards to match the 6 vocabulary cards. To make the game more difficult, make more than 6 photo cards.

Student Project Ideas: Place students in 6 groups, giving each group one photo of a simple machine. Have the students study the photo and answer the question, "How did this machine make life easier for those using it?" The students may choose to answer the question by making a poster, writing an essay or preparing a presentation. All members in the group must participate.
Use rubric for grading (http://rubistar.4teachers.org/).

Integrated Curriculum Extensions: Take students to *Greenfield Village*, giving each small group a camera. Have each group find and photograph as many different simple machines as they can. Develop the film and have the groups prepare presentations. Have students graph results of each simple machine found. Using the data, answer mathematical questions regarding the graph.

- Have the students make a timeline of the simple machine cards used in the matching game.
- Map the locations of the machines in the village used in the matching game using a map of Greenfield Village.

Anticipated Challenges: Students may have difficulty working in groups. The teacher may allow students to work independently

Curriculum Links: Michigan GLCE Science- S.IA.03.12 Share ideas about science through purposeful conversation in collaborative groups.
Common Core Curriculum- Third Grade Reading- Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). Third Grade Writing- Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

Simple Machine Activity

Photographs

Vocabulary Cards

*Laminate cards before using

Answers:

1. Water Pump	Lever
2. Staircase	Inclined Plane
3. Gristmill	Wheel and Axle
4. Sifter	Wheel and Axle
5. Scythe	Wedge
6. T. Edison's Lab	Pulley
7. Locomotive Wheel	Screw (look at arrow)
8. Model T	Various

Lesson plans created by participants of the 2010 NEH Landmarks of American History Workshop for School Teachers, America's Industrial Revolution, at **The Henry Ford**.

2010 LMK

Staircase at Firestone Farm

2010 LMK

Water pump at Firestone Farm

Grist mill at Greenfield Village

Sifter at Firestone Farm

2010 LMK

Locomotive wheel at the Roundhouse

2010 LMK

Model T at Ford Rouge Factory

Scythe used at Firestone Farm

Thomas Edison's Lab

Vocabulary Cards

Lever	Pulley
Wheel and Axle	Inclined Plane
Screw	Wedge

Name _____

Notes: Simple Machines

Screw	Lever
Wedge	Inclined Plane
Pulley	Wheel and Axle

Name:_____

K-W-L: Simple Machines

What do you Know?	What do you Want to learn?	What did you Learn?

Simple Machines

(n) a simple device that makes "work" easier.

Six Types:
wedge
wheel and axle
pulley
screw
lever
inclined plane

Wedge

- ***A wedge is an object with at least one slanting side ending in a sharp edge, which cuts material apart.***

Staple
Scythe
Door holder

Wheel and Axle

- *A wheel with a rod, called an axle, through its center lifts or moves loads.*

Cars
Roller Blades
bicycle

Inclined Plane

- *An inclined plane is a slanting surface connecting a lower level to a higher level.*

Bathtub
Ramp
Stairs

Pulley

A pulley is a simple machine that uses grooved wheels and a rope to raise, lower or move a load.

Gears
Flagpole

Screw

A screw is an inclined plane wrapped around a pole which holds things together or lifts materials.

Door lock
Swivel chair

Lever

A lever is a stiff bar that rests on a support called a fulcrum which lifts or moves loads.

Stapler
Seesaw

Complex Machines

- Made up of 2 or more simple machines

Stapler
Lever, wedge

Car
Pulley (seatbelt), Lever (pedal)

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Middle School Lesson Plan 1

Beverly Hill, Creekside School, Dexter, MI

Title of the Lesson: Energy and Inventors Integrated Science and Language Arts Lesson

Grade Level: 6

Overview: This lesson will be used at the beginning of the energy unit to introduce the concepts of kinetic and potential energy and to make observations associated with these concepts. Students will then research inventors and present a simple experiment and a report about the inventor using a form of computer technology such as PowerPoint, video or any group choice to show the process that the inventor used resulting in their discovery.

Central Question: What is energy? What kinds of energy can be observed? What process did the inventor use in their experimentation?

Assessment Tools: Rubric

Evidence Sources: Teacher will present a simple experiment - making the "best" airplane. Students will conduct this experiment in class and record results on a chart. Class discussion will center on variables, kinetic and potential energy. Each group will construct a chart with at least three recordings with individual and group averages. Teacher will then present a PowerPoint presentation with photos taken at *Henry Ford Museum* and with materials obtained from the many resources available about the Wright Brothers. This presentation will show how simple experiments resulted in their flying machine.

Time Frame: Two weeks

Instructional Sequence:

Day One - Describe who scientists are and what they do and the nature of science. Talk about the human qualities of scientists. Review terms - variables, kinetic and potential energy. Read and discuss a unit in Science Plus book - Science and Technology.

Day Two - Continue discussions and introduce making a model airplane. Give students a straw and directions (two pieces of paper attached 1.5 cm by 9 cm and 2 cm by 12 cm). Groups will be divided into groups of four to make charts for their science folder. Paper should include hypotheses, variables, points of potential and kinetic energy. Chart should be made neatly (example on white board) showing at least three measurements from each member and individual and group averages.

Day Three - Experiment - supply tape measures. Experiment outdoors but if poor weather, in hall or science lab.

Day Four - Discuss experiment. Discuss neatness and detail in their experiment. Charts will be placed

in their science folder and graded at the end of the week.

Day Five - Teacher will make a PowerPoint presentation and provide information on the Wright Brothers. The Wright Brothers developed a curiosity early in life by looking at birds and kites and by having a scientific awareness. Teacher presents a simple experiment and a PowerPoint presentation on an inventor. Teacher passes out rubric to explain that each group will pick an inventor and do a simple experiment and research presented using some form of computer technology - PowerPoint, video, web page, written report or other creative sources - about their inventor. (Note that there will be no duplication of inventors in each class.)

Day Six - Research Computers for all students will be supplied. Video cameras will also be supplied if students are producing a video. Books will also be available that teacher has checked out from the media lab.

Day Seven - Review rubric and set timeline of presentation due on day ten.

Day Eight and Nine - Research - assist groups with research and experiments

Day Ten - Presentations

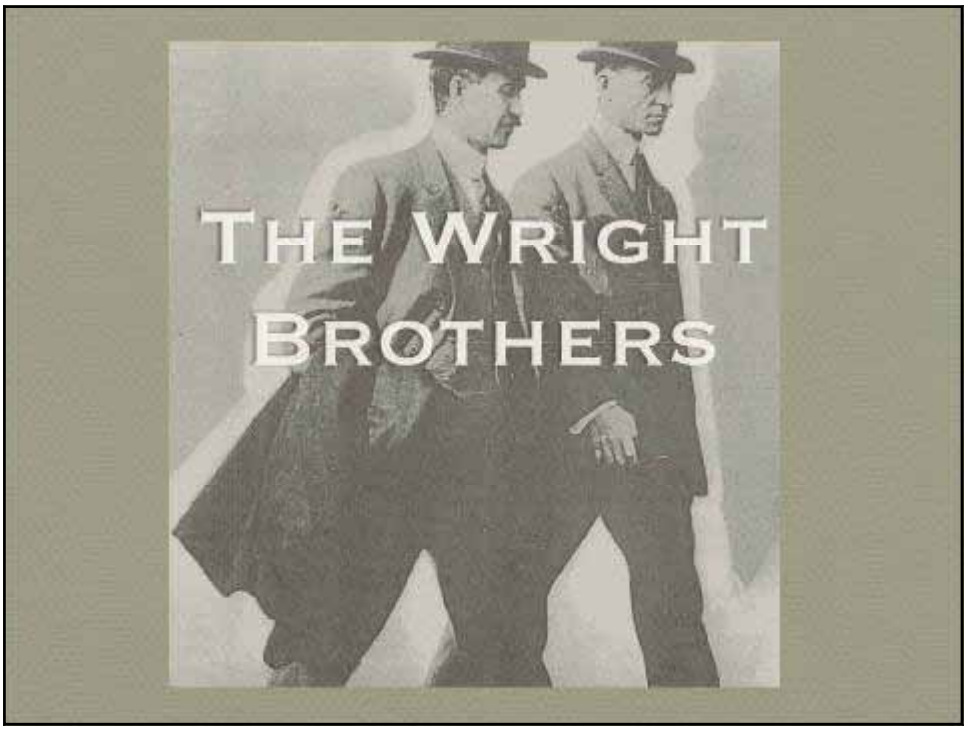
Student Project Ideas Since this is a group project most of the assignment will be in class but the classroom will be open before school and one or two nights after school if groups need extra time.

Anticipated Challenges: One challenge for sixth grade students will be working in groups. Teacher should make every effort to form groups that will work together and work toward a final presentation. Also, a list of inventors for which resources are available so that it will not be a challenge to find information.

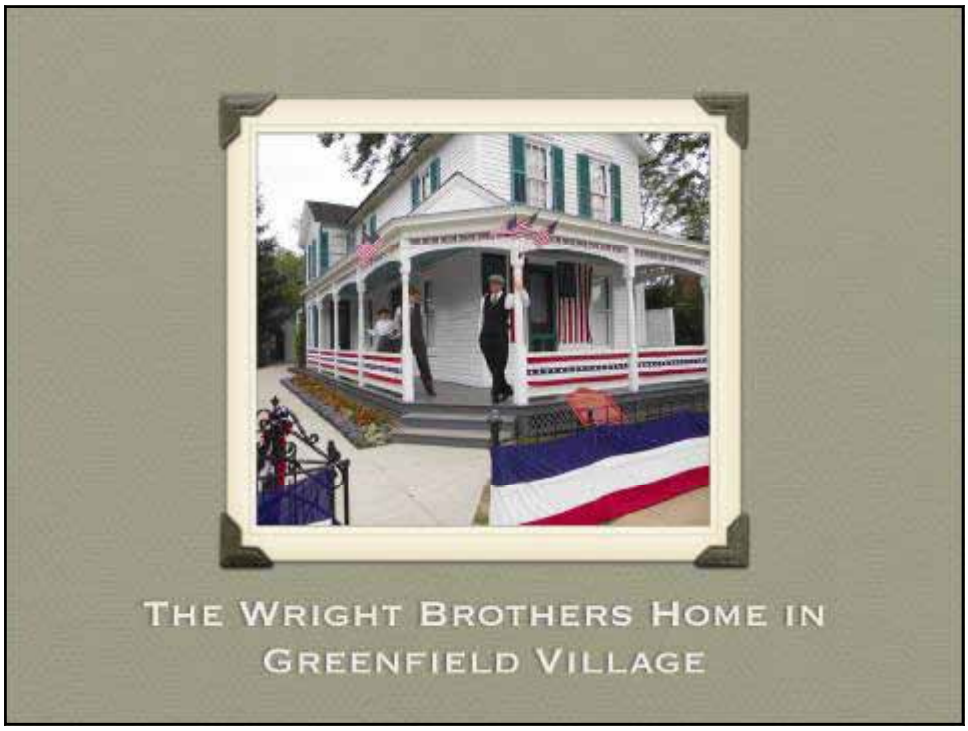
Curriculum Links: P.E.N. M1 - Objects and substances in motion have kinetic energy.
S.IP.M.1 - Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.
S.IP.06.11 - Generate scientific questions based on observations, investigations and research.
S.IP.06.12 - Design and conduct scientific investigations.
W.GN.06.03 - Formulate research questions using multiple resources and perspectives that allow them to organize, analyze and explore problems and pose solutions that culminate in a final presented project.
W.P.R. 06.01 - Set a purpose, consider audience, and replicate author styles and patterns when using an informational text.
R.IT. 06.02 - Analyze text patterns, including descriptives, chronological sequences and problem/solution.
RCM.06.4 - Apply significant knowledge from grade level science, social studies and mathematics text.

Energy and Inventors Rubric

Score Levels	Demonstration	Research	Oral Presentation	Group Work	Score
4 (25 pts)	Design shows that group analyzed the problem with data (variables, kinetic and potential energy) recorded in an orderly manner that accurately reflects the results of the experiment. All components have been addressed beyond expectations.	The report is extremely clear and focused. The group presents terrific ideas and has carefully chosen unusual and interesting details. The audience finds this very interesting and everyone is very focused on the report.	Excellent eye contact, voice projection, pleasing tone and engaging style. All of the group members are involved in the presentation.	Excellent teamwork, good behavior, worked together to meet all deadlines and project requirements.	
3 (20 pts)	Design shows that the group grasped the basic idea of scientific process with data that probably represents the results of the experiment. All components of the experiment have been addressed.	The report is clear and focused. The group uses many great ideas and uses many details that match the topic most of the time.	Adequate eye contact, voice projection, time and style. All of the group members are involved in the presentation.	Some teamwork, little misbehavior, met most deadlines and project requirements.	
2 (15 pts)	Design shows the basic idea of scientific process but data was recorded in a disorganized manner or only with teacher assistance. All components have been addressed but very little elaboration is present.	Writing is sometimes clear and focused. Some of the details match the topic. More details are needed.	Little eye contact, poor voice projection, tone and style. Most of the group members are involved in the presentation.	Poor teamwork, some misbehavior, sometimes late for deadlines and project requirements.	
1 (10 pts)	Design shows group conducted an experiment when given considerable help by the teacher. Data was recorded in an incomplete manner or only after considerable help from the teacher. All components have been addressed but no elaboration is present.	Only a few parts of the groups writing are clear and focused. The report does not have enough details or they don't match the topic.	No eye contact, voice too low to be heard, poor tone and style. Few members of the group are involved in the presentation.	No teamwork, poor classroom behavior, failed to meet deadlines, and project requirements.	



Orville and Wilbur Wright were born in Dayton Ohio. They were the first to open the long deserted lanes of the air to mankind. Their father encouraged interest in scientific principles by giving them toys which would stimulate their curiosity. One of these toys was a helicopter model which would rise and flutter in the air.

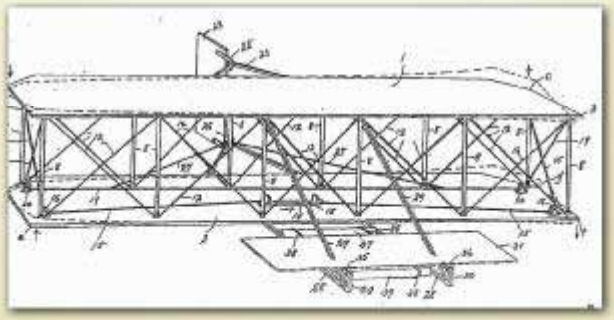


THE WRIGHT BROTHERS HOME IN GREENFIELD VILLAGE

In 1892, Orville and Wilbur opened a bicycle shop, The Wright Cycle Shop.

WILBER AND ORVILLE'S BICYCLE SHOP

While continuing to run their bicycle business, Wilbur and Orville studied the problems of mechanical and human flight. The Wright Brothers read everything they could about bird flight and became convinced that human flight was possible.



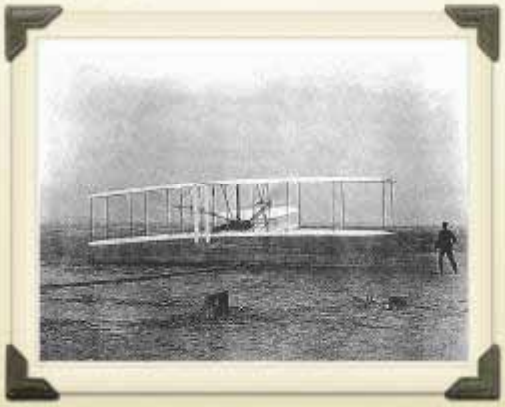
On May 30, 1899, Wilbur Wright wrote to the Smithsonian Institution inquiring about any publication on aviation subjects. The Wright Brothers read everything that the Smithsonian Institution sent them.

They decided to conduct experiments on their own.

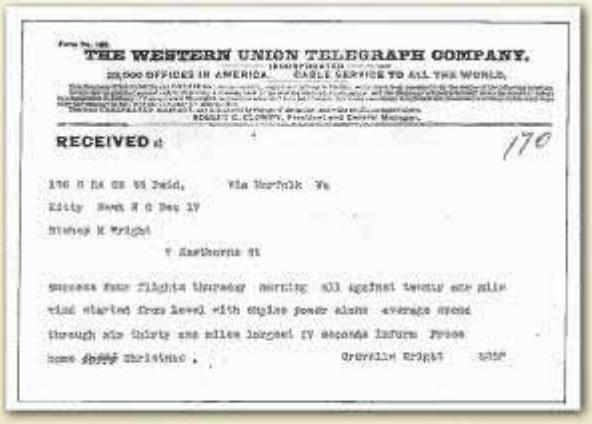
That same year, the Wright Brothers built a biplane kite to test their "wing - warping" method of controlling a flying machine. This experiment encouraged the Wright Brothers to proceed with constructing a flying machine with a pilot.

The "Flyer" lifted off from level ground at 10:35 a.m. on December 17, 1903. Orville piloted the plane which weighed six hundred and five pounds. The first heavier-than-air flight traveled one hundred twenty feet in twelve seconds. The two brothers took turns during the test flights.

As part of the systematic practice of photographing every prototype and testing of their various flying machines, the Wright brothers persuaded an attendant from a nearby station to snap a photograph in full flight.



After making two longer flights that day, they sent a telegram to their father, instructing him to "inform the press!"



THE WESTERN UNION TELEGRAPH COMPANY.

RECEIVED at

170

Kitty Hawk N C Dec 17

Bishop M Wright

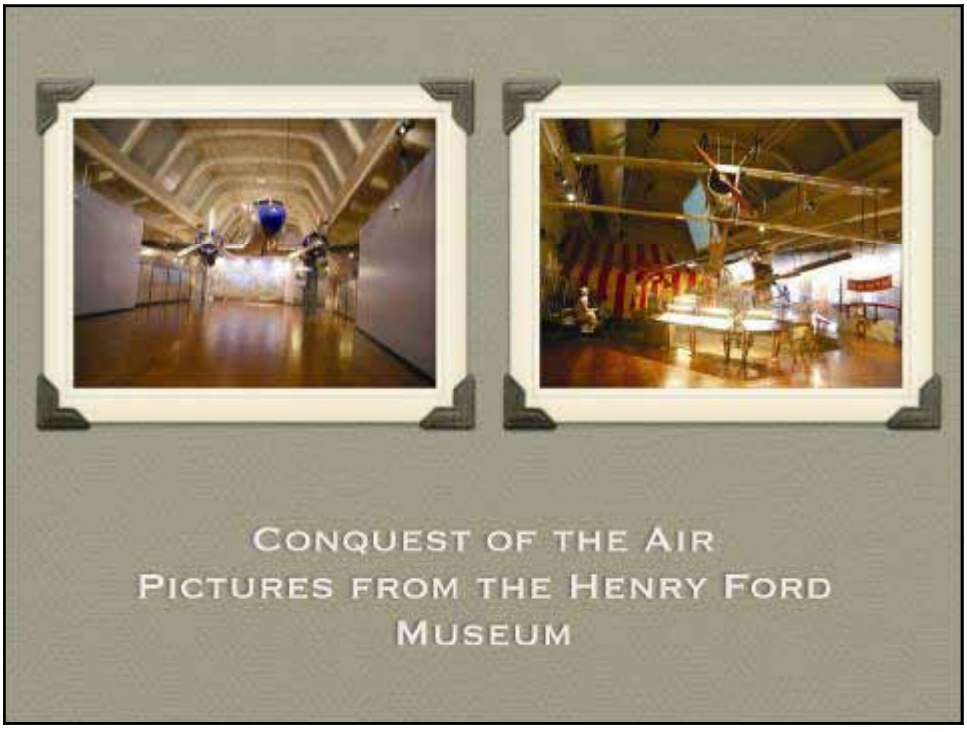
7 Hawthorne St

Success four flights thursday morning all against twenty one mile wind started from level with engine power alone average speed through air thirty one miles longest fifty seconds inform press home Christmas .

Orevill Wright

"The airplane stays up because it doesn't have time to fall."

Orville Wright



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Middle School Lesson Plan 2

Daria Neal, University Prep Science and Math Middle, Detroit, MI

Unit Title: Industrial Revolution Technology: Help or Harm?

Grade Level: Middle School (US History or World History)

Time Frame 12-23 days

Overview: For this unit, all students will be tracing the progress of growth by investigating one chosen piece of technology that was introduced between 1750 and 1880. Students have the opportunity to select several different ways to demonstrate their research skills, understanding of the technology, analysis of the impact of the technology's introduction and evaluate if the introduction of this technology HELPED or HARMED citizens by judging its overall impact.

Central Question: How did the Industrial Revolution change (or REVOLUTIONIZE) daily life? Specifically, explain how ONE piece of technology introduced between 1750 and 1880 alter the means of production, consumption and distribution of goods once it was adopted? Were these changes good or bad?

Learning Objectives: Students will be able to

- select a labor saving device and describe the changes that the selected piece of technology provided in one industry (agriculture, food production, communication, metallurgy, textile, transportation)
- Trace the development of the technology using a timeline showing the introduction and major improvements or events linked to this piece of technology
- Use graphics (charts, graphs, maps and pictographs) to demonstrate the impact of adopting the technology the industry by comparing and contrasting one selected element of the industry

- Persuade potential users of the technology of the benefits of the device and/or technological innovators[1]

Assessment Tools: K-W-R-L chart and entries, intermediate products check-ins, final products, evaluation of oral/aural or other presentations.

Key Concepts: Technology created changes in different industries in different ways

Change within the Industrial Revolution was gradual rather than immediate

Changes had a beneficial AND deleterious effect

Evidence/ Sources: In addition to US History texts, the unit includes by site visits, on-line research and supplemental materials including journals, historical fiction (such as the American Girl series) depending on team teaching options including Math, Science and/or Language Arts instructors.

Physical Sites (South East Michigan)
The Henry Ford – Greenfield Village (Dearborn, MI)

Charles H. Wright Museum of African American History (Detroit, MI)

Detroit Historical Society (Detroit, MI)

Southern Michigan Railroad Museum (Clinton, MI)

R.E. Olds Transportation Museum (Lansing, MI)

Troy Museum and Historic Village (Troy, MI)

Washtenaw County Historical Society (Ann Arbor, MI)

On-line Sources (based on The Henry Ford History Hunters ©)
www.TheHenryFord.org/education

- Model T. Road Trip Interactive Module
- The Rouge: An Overview PowerPoint Show
- Henry Ford's Innovations at the Rouge PowerPoint Show

[1]See attached Industrial Revolution Student Project Description for specific products and project choices.

- Colonial Family and Community Interactive Module
- Living Under Enslavement at Hermitage Plantation Interactive Module
- Toys Online Exhibit

Anticipated challenges: Often, the Industrial Revolution is presented as a sweeping change that affected all Americans equally and immediately. To the contrary, the Industrial Revolution occurred over a long period of time during which there were several cumulative small steps. Each step led to more and more improvements in the technology that resulted in what became huge leaps on the impact of American's lives.

Curriculum Links: Michigan Middle School GLCEs (National Geography Standards are referenced after expectations where appropriate.)

USHG ERA 6 – THE DEVELOPMENT OF AN INDUSTRIAL, URBAN, AND GLOBAL
UNITED STATES (1870 – 1898 in Grade 8)
6.1 America in the last half of the 19th Century (introduced in Grade 8; begins high school USHG)
6.2 Policy Issues in USHG Eras 3-6 (P2)
*Geography, Civics and Government, and Economics are integrated into the historical context.

U6 USHG ERA 6 – THE DEVELOPMENT OF AN INDUSTRIAL, URBAN,
AND GLOBAL UNITED STATES (1870-1930**)**
Grade 8 begins to address trends and patterns in the last half of the 19th century, through 1898.
U6.1 America in the Last Half of the 19th Century
Analyze the major changes in communication, transportation, demography, and urban centers, including the location and growth of cities linked by industry and trade, in last half of the 19th century. The purpose of this section is to introduce some of the major changes in American society and the economy in the last part of the 19thCentury. This era is expected to be addressed in-depth and with greater intellectual sophistication in the high school United History and Geography content expectations[2].

[2] Michigan Grade Level Content Expectations for Middle School Social Science (Michigan Department of Education).

8 – U6.1.1 America at Century's End – Compare and contrast the United States in 1800 with the United States in 1898 focusing on similarities and differences in[3]

- territory, including the size of the United States and land use (National Geography Standards 1and 16, pp. 144 and 196)
- population, including immigration, reactions to immigrants, and the changing demographic structure of rural and urban America (E3.2) (National Geography Standards 9 and 12, pp. 160 and 167)
- systems of transportation (canals and railroads, including the Transcontinental Railroad), and their impact on the economy and society (E1.4, 3.2) (National Geography Standard 11, p. 164)
- governmental policies promoting economic development (e.g., tariffs, banking, land grants and mineral rights, the Homestead Act) (E.2.2) (National Geography Standard 16, p. 176)
- economic change, including industrialization, increased global competition, and their impact on conditions of farmers and industrial workers (E1.4, 2.1, 3.2) (National Geography Standard 11, p. 164)
- *the treatment of African Americans, including the rise of segregation in the South as endorsed by the Supreme Court's decision in Plessy v. Ferguson, and the response of African Americans*
- *the policies toward American Indians, including removal, reservations, the Dawes Act of 1887,and the response of American Indians (National Geography Standard 13, p. 169)*

U6.2 Investigation Topics and Issue Analysis (P2)- Use the historical perspective to investigate a significant historical topic from United States History Eras 3-6 that also has significance as an issue or topic in the United States today.

[3] Items in italics may or may not be addressed depending on the

8 – U6.2.1 United States History Investigation Topic and Issue Analysis, Past and Present –Use historical perspectives to analyze issues in the United States from the past and the present; conduct research on a historical issue or topic, identify a connection to a contemporary issue, and present findings (e.g., oral, visual, video, or electronic presentation, persuasive essay, or research paper); include causes and consequences of the historical action and predict possible consequences of the contemporary action. (National Geography Standards 9 and 10, pp. 160 and 162)

Skills instruction: To ensure students are able to complete the project products successfully, instructors should ensure that all students can complete the several tasks effectively. You may have already taught many of the requisite skills throughout the year prior to this unit. Some instructors find that co-teaching or team teaching several of the skills is effective. Other grade level teams find that using this type of project lends themselves to a cross-curricular approach in which several components of the project are assessed. A "day" is a class session.

Skills/Tasks	Team Teaching areas	Approximate days to teach this skill[4]
Use Internet Search engines to locate information Evaluate results of internet searches to ensure that the information is relevant and trustworthy Identify elements of a good persuasive piece (ex: pamphlet, advertisement, commercial) Create a written or oral persuasive piece using technology (ex: pamphlet, advertisement, commercial)	Social Science Business Education/ Computers/ Media Arts Language Arts	1-4
Select relevant information from a variety of sources Summarize and paraphrase relevant information Create MLA style citations and bibliography Identify elements of memoirs and journal writing Write a journal Use examples and details to support a given thesis statement*	Social Science Language Arts	3-5
Read bar graphs and evaluate the information included Read line graphs and evaluate the information included Read pie graphs and evaluate the information included Read pictographs and evaluate the information included Read charts and evaluate the information included Create accurate bar graphs from information gathered Create accurate line graphs from information gathered Create accurate pie graphs from information gathered Create accurate pictographs from information gathered Create accurate bar graphs from information gathered	Social Science Mathematics	2-4
Read timelines and evaluate the	Social Science	2-4

[4] For students with no prior knowledge.

information included Create accurate timelines from information gathered Use scale appropriately when reading maps Use scale appropriately to create/evaluate schematics*	Mathematics	
Read a political map and evaluate the information included Read a special purpose map and evaluate the information included Create an accurate special purpose map from information gathered Read a blueprint or other technical schematic Use scale appropriately to create/evaluate schematics*[5]	Social Science Science	1-3

Project instruction: Below is a suggested timeline for introducing the Industrial Revolution Student Project. A "day" is a class session.

Anticipatory Set/ Prior Knowledge	Direct instruction of content	Student Research (includes time at Greenfield Village)	Organizing information[6]	Student project completion and presentation	Evaluation
1-2 days	2-3 days	3-6 days	3-6 days	2-4 days	1-2 days

[5] Items noted with an asterisks (*) are skills that are needed for one of the optional project products on Tier 3.

[6] The Student Research time and Organizing information time may be more fluid. There will probably be overlap between these two components of the project.

Industrial Revolution Project Description

Often, the Industrial Revolution is presented as a sweeping change that affected all Americans equally and immediately. To the contrary, the Industrial Revolution occurred over a long period of time during which there were several cumulative small steps. Each step led to more and more improvements in the technology that resulted in what became huge leaps on the impact of American's lives.

For this unit, all students will be tracing the progress of growth by investigating one chosen piece of technology that was introduced between 1750 and 1880. Students have the opportunity to select several different ways to demonstrate their research skills, understanding of the technology, analysis of the impact of the technology's introduction and evaluate if the introduction of this technology HELPED or HARMED citizens by judging its overall impact.

Step One: Select and area to investigate.

Agriculture[7] Food Production Communication Metallurgy Textile Transportation

Step Two: During your site visit to Greenfield Village[8] and/or using your own research, select one piece of technology to investigate.

Step Three: Review the chart below with your instructor. You MUST complete ALL of the activities on Tier One. You can choose one activity on Tier Two to complete. To earn an extra 10% overall on this project, select ONE Tier Three activity to complete. The Tier Three activities are NOT required; however, successful completion of one Tier Three activity will earn extra credit. You may NOT complete more than one Tier Three activity NOR may you complete Tier Three activities INSTEAD of the mandatory Tier One and Tier Two activities.

[7] Please note, Agriculture refers to the process of growing items for use, whether they be food item or items for other use (ex: tobacco, corn – an animal feed at this time). Food production is specifically tied to processes of taking items and preparing them to be consumed as food by humans (ex. Butchering, milling grains).

[8] Site visit to Greenfield village will group students based on her/his area selection. Agriculture and Food Production sites include Daggett farm, Susquehanna Plantation, Firestone Farm and Gunsolly Carding Mill, Loranger Gristmill, Luther Burbank Garden Office, George Washington Carver site, Soybean Experimental Laboratory. Transportation and Communication sites include Tripp Sawmill, Spotford Sawmill, Menlo Park, The Detroit, Toledo & Milwaukee Roundhouse, Wright Cycle shop, Richart Wagon shop, Model T, Weiser Railroad and Omnibus Rides. Textile and Metallurgy sites include Daggett farm, Gunsolly Carding station, Weaving shop, Hermitage Slave Quarters, Armington and Sims and Post Office and Tin shop. Instructors unable to visit Greenfield Village should review the online investigations listed at the end of the project description to determine which activities would be best suited.

Industrial Revolution Project for 8th Grade Humanities Selection Menu

	Activity Description	Student Selection/Comments
TIER ONE Must complete all	□ Describe the work that the piece of technology does. Who would use it and in what context (ex: farmers, housewives, skilled technicians) □ Trace the development of the technology using a timeline showing the introduction and major improvements or events linked to this piece of technology □ Determine the relative cost of the item (compare the cost at the time to average monthly or annual wages) □ Create a graphic (line graph, pie graph, bar graph, map or pictograph) that demonstrates the impact of adopting the technology the industry. For example, if you chose the Cotton Gin; create a line graph showing the production of cotton from 1750 to 1880.	

	Activity Description	Student Selection/Comments
TIER TWO Select One	□ Write a realistic journal including at least 8 entries of a person who would have used this technology. At least two entries must have been "written" before the technology was adapted. □ Create a three-dimensional "Museum Installation" for your piece of technology. Alternatively, you may use the Henry Ford website to create a virtual "Museum Installation." The installation must include a written explanation of the work comparing how the tasks were done PRIOR to the technology and AFTER the technology. The installation must also include visual artifacts (pictures, technical drawings, videos) explaining how the technology worked. □ Create a "sales pitch" in the form of an oral presentation or pamphlet to "sell" this piece of technology to a potential client. Make sure to discuss how this purchase will enhance their quality of life. Include a realistic presentation of the "before" □ Create a monument for an unsung hero/heroine of the Industrial Revolution. Include 4-5 biographical facts and a 2-3 paragraph discussion explaining her/his impact on the Industrial Revolution. Include 2-3 visual artifacts (drawings, pictures, videos, copies of letters/speeches/ quotes) that underscore the impact s/he had. Create a welcome pamphlet or oral/video loop to be played for visitors upon their arrival.	

	Activity Description	Student Selection/Comments
TIER THREE Optional for 10% extra Credit	➢ Create a speech/pamphlet to the Luddite movement encouraging their position. Use well researched and noted sources, charts and graphs discussing the impact of 1 to 2 pieces of technology over a 50 year period. Keep in mind the Luddites were AGAINST many advances in technology, so your information must describe the negative impact of the technology. ➢ Write a well researched position paper with complete bibliography in MLA format. Prove the thesis – Technology adopted during the Industrial Revolution led to more class distinctions". Make sure to include descriptions, definitions, treatments and opportunities for working class, middle class and skilled labor. ➢ Create a working model of the technology studied based on research and examples. You MAY (for an additional 5% extra credit) include necessary improvements with an explanation. Demonstrate the model in class.	

America's Greatest History Attraction

High School Lesson Plan 2

Ola Schafer, Russia Local School, Russia, OH

Lesson Title: Farming and the Industrial Revolution

Grade Level: 9th-10th Grade American History

Overview: Having some knowledge of the origins of the industrial revolution, (from the current course or previously) students will explore the effects of technological innovations on agriculture and rural lifestyles from the colonial period to the present. Students will use primary and secondary source documents, photos and field trips on which to base conclusions as to how technology impacted farm size, labor, and age and gender roles by comparing farming in the colonial period, the 19th century and the 20th century. My focus is on agriculture in the northern U.S., but by using data and resources specific to your own region and adapting the lesson, similar patterns can be uncovered for all regions.

Central Question: How did the Industrial Revolution transform agriculture and rural life in America between the colonial period and present day?

Supporting Questions:

- What technology innovations became commonplace?
- How did technology alter farming operations and farm life?
- In what ways did agricultural technology affect the size of farms and the labor required to complete day-to-day tasks?
- How did the use of technology change the role of and family dynamics of rural Americans over the course of 200 years?

Learning Objectives: Students will:

1. Utilize library and internet to conduct historical research and develop research skills

2. Analyze primary source documents and secondary source materials to draw logical conclusions about the effects of the industrial revolution on agriculture. (Technology led to increasing acreage under

cultivation, the need for fewer farm laborers and more narrowly defined roles for men, women and children in rural northern U.S.)

3. Discern the value of the sources located and use the data collected to answer the questions posed.

4. Draw conclusions from observations and data collected on field trips.

Assessment Tools: During the unit, formative assessments will be teacher observation of student interaction with peers, questions posed by students to guide research and utilization of resources to organize and complete notes and records. This will determine how much guidance, direct instruction and/or redirection/review will be needed. At the conclusion of the unit students will independently construct responses to DBQs put together by the teacher from some of the data collected and selected by the teacher. Students will also write an essay in response to the central question.

Key Concepts: Technological innovations changed the way people in rural America worked; technological innovations changed social dynamics of rural families over time.

Evidence/Sources: The Henry Ford online resources at:

http://www.thehenryford.org/exhibits/smartfun/Colonial/intro/index.html Be a history detective and investigate the 18th century Daggett family from Coventry, CT.

http://www.thehenryford.org/museum/agriculture.aspx See photos of farm equipment from 19th century to modern equipment.

http://www.thehenryford.org/exhibits/collections/default.asp More photos of farming and farm equipment

Field trips to living history museum villages or farms from the 18th and 19th centuries and a present day farm in your area. Suggested sites to visit:

Greenfield Village and Henry Ford Museum, Dearborn, MI. http://www.thehenryford.org/;

Hale Farm, Bath, OH.
http://westernreservepublicmedia.org/halefarm/

http://cleveland.about.com/od/clevelandattractions/p/halefarm.htm;

Sauder Village, Archbold, OH.
http://www.saudervillage.org/home/default.asp;
(late 19th century farm)

Johnston Farm, Piqua, OH.
http://www.piquaoh.org/johnstonfarm.htm;
(early 19th century frontier farm)

Conner Prairie, Fishers, IN. http://www.connerprairie.org/
(early & late 19th century sites)

Local and state libraries, university libraries and/or archives to gather information from county plat books, state statistics, census records, etc. to compile data for comparison.

County extension agents as a resource (They may come to the classroom to talk with your class)

Modern working family farm (Many farm families are happy to have visitors and give tours of their operation and/or answer questions)

Time Frame: 11-17 days depending on the length of your class period and whether or not the field trips are part of the experience.

Instructional Sequence: **Part 1** (3-4 days)

1. Introduce the unit…use a short story, read a letter or diary entry to hook students into the topic. Conduct a brief class discussion to review the industrial revolution's origin in the U.S. – when, where, why. Point out that by 1900 the U.S. was the leading industrial nation in the world, but the effects of the industrial revolution were felt a bit later in rural America. Pose the central question.

2. Explain to students that they will be collecting data from three historical eras – colonial period, latter 19th century, late 20th century, analyzing it and drawing conclusions to form a response to the central question.

3. Divide the class into 'research teams' of 3 or 4 students.

Distribute the Data Collection Sheet for the Colonial period and the research questions for the period. (a copy for each student). Allow time for the students to familiarize themselves with the worksheets.

4. Connect to the Henry Ford website and project the Daggett Family history detective interactive activity. Do this as a class introductory activity showing the Quicktime movies. Suggest that the students take notes on the data collection worksheets.

5. Distribute the "Daggett Farmhouse - General History" from the Collections of the Henry Ford in the Benson-Ford Research Center. [This can be ordered from the **Benson Ford Research Center, 20900 Oakwood Blvd. PO Box 1970, Dearborn, MI 48121-1970 Phone: 313/982-6020**. **Research.center@thehenryford.org**
Daggett Farm House Building Box Accession Number #186;; File Folder Heading: "Daggett Farm House - History, General".] Direct the students to read the history. In their research teams have them develop responses to the guiding questions sheet and work on adding to the Data Collection Worksheet. Be sure to circulate about the room to answer questions and assist the groups in finding needed info if necessary.

6. Field trip to Greenfield Village's Daggett Farm and Henry Ford Museum if possible…or a colonial farm museum in your region if available

7. Hold a class discussion to share information and conclusions the students have drawn regarding farming in the colonial period.

Part 2 (3-4 days)
1. Distribute Data Collection Sheet [attachment C] for the latter 19th century and research questions for this period [attachment D]. Allow students to read over the questions.

2. In the library or computer lab have students conduct research to complete the data collection worksheet and research questions. Using state statistics from the period find the acreage for given crops per county, value of agricultural produce, number of tractors, threshers, etc. Use state atlases and/or county plat books from the period to discover farm sizes, number of acres under cultivation, etc.

Search for account books, diaries, or other material from the period to analyze.

3. Field trip to Greenfield Village's Firestone Farm and Henry Ford Museum if possible…. or a 19th century farm museum or living history site in your area.

4. Provide time for students to compile and discuss the information they have collected in their teams, then hold a class discussion to share this information and draw conclusions regarding farming in the late 19th century.

Part 3 (3-4 days)
1. Distribute Data Collection Sheet [attachment E], research questions [attachment F] for the current era and suggested interview questions [attachment G]. Allow students to read over the questions.

2. In the computer lab have students conduct research on modern farming methods and machines and farm life. Again, they should search modern state statistics for agricultural production by crop per county, value of agricultural produce, current plat books, farm periodicals, etc. to find information to complete the data sheets.

3. Have the students contact and interview area farmers about their operation and family roles using the interview questions as a guide.

4. Arrange a field trip to an area family farm to see what machines and methods are used and who and how many people are involved in running the operation.

4. Allow teams to compile and discuss the data collected concerning modern farming methods, machinery and operations.

Part Four: Write Up & Assessment (2 days)
1. After teams have completed their data collection and team discussions have the teams come together for a whole class discussion. Create a wall chart of the key info collected and discuss the changes that took place in farming and family life since the industrial revolution began in America.

2. Individually, students will receive a sampling of documents and a set of questions to answer based on the documents. Finally, have students write an essay to respond to the central question. Be sure they know how many points you expect them to make in their discussion and that each point needs to be supported with data. (This could be done as a 'take-home' essay, as an in-class essay with each student utilizing the notes and data they collected or as an extemporaneous essay without materials at hand.)

**Many schools are experiencing budget woes and do not allow field trips, or your school may not be close enough to an appropriate living history museum to make a field trip a possibility. You can complete the unit without field trips although hands-on opportunities make for a more memorable experience.*

Student Project Ideas:

1. Students could create murals/diagrams of farmsteads in each century depicting the changing technology and age/gender roles

2. Students could write narratives of rural life in one or more of the times periods covered.

3. Students could create an illustrated timeline of the development of farm implements from the late 18th century to the present.

4. Students could create museum displays of agricultural artifacts (or photos of artifacts)
5. Students could extend the unit by researching music that reflects the lifestyle of rural America in each time period.

Anticipated Challenges:

1. Misconceptions about family roles on a farm in each time period may be in error.

2. The language of primary resources may make understanding difficult without teacher support or explanation. Letters and handwritten accounts from the past are often difficult to decipher. You may want to locate transcribed copies if possible.

3. It may be difficult to find some of the necessary data if access to libraries is limited or if digitized records are unavailable.

Curriculum Links:

Ohio Standards:

- **History Benchmark B**; Explain the social, political and economic effects of industrialization. Indicator 1. Explain the effects of industrialization in the U.S. in the 19th century including: a) changes in work and the workplace; c) modernization of agriculture
- **Social Studies Skills & Methods Benchmark B**; Use data and evidence to support or refute a thesis. Indicator 1. Detect bias and propaganda in primary and secondary sources of information; 2. Evaluate the credibility of sources for: a) logical fallacies, c) unstated assumptions, d) bias; 3. Analyze the reliability of sources for: b) adequate support of statements; 4. Develop and present a research project including: a) collection of data, C) construction and support of the thesis.

National Standards in World History

- **7.2.B** The student understands how industrial economies expanded and societies experienced transformations in Europe and the Atlantic basin. Therefore the student is able to: Explain how industrialization affected class distinctions, family life, and the daily working lives of men, women, and children.
- **7.5.A** The student understands connections between major developments in science and technology and the growth of industrial economy and society. Therefore the student is able to analyze how new machines, fertilizers, transport systems, commercialization, and other developments affected agricultural production in various parts of the world.

Attachments:

A. Data Collection Sheet on Agriculture in the Colonial/Early Republic period

B. Guiding questions for the Colonial Period

C. Data Collection Sheet on Agriculture in the latter 19th century

D. Guiding questions for the 19th century

E. Data Collection Sheet on Agriculture in the late 20th century

F. Guiding questions for the Modern Period

G. Interview Guiding Questions

H. Technology Research Worksheet

DATA COLLECTION SHEET
AGRICULTURE in the COLONAL PERIOD
[Attachment A]

Farm Size (number of acres under cultivation, in pasture and in woodlot)

Crops Grown

Farm Machines commonly used

Farm Labor (who did what/ how many people were needed)

Tasks to be done and by whom

RESEARCH QUESTIONS
for the COLONIAL PERIOD
[Attachment B]

1. Were the number of acres under cultivation equal to the acres owned? Why or why not?

2. How many people were needed to do the farming? Were there hired hands? What jobs were the
children expected to do?

3. What sorts of non-farm jobs were done? Did the wife or children work off the farm?

4. Were the tools used home-made or purchased? What sorts of tools saved labor?

YOUR QUESTIONS…?

DATA COLLECTION SHEET
AGRICULTURE in the LATTER 19th CENTURY
[Attachment C]

Farm Size (number of acres under cultivation, in pasture and in woodlot)

Crops Grown

Farm Machines commonly used

Farm Labor (who did what/ how many people were needed)

Tasks to be done and by whom

RESEARCH QUESTIONS
for the LATTER 19th CENTURY
[Attachment D]

1. How do the sizes of the farms compare to the Colonial period? How do the numbers of acres under
cultivation compare to the Colonial period?

2. How does the use of tools and machines compare to the Colonial period? Were they home-made or
purchased? Was there more work done by hand or machine? Why or why not?

3. Were there more, fewer or about the same number of laborers needed to complete farm tasks in the
latter 19th century compared to the Colonial period? Did the laborers tend to be family members or
were the laborers hired hands?

4. Did gender make a difference in who performed farm tasks? What was each gender responsible for?

5. What relationship do you see between technology, farm size and labor?

YOUR QUESTIONS….??

DATA COLLECTION SHEET
AGRICULTURE in the LATE 20th CENTURY
[Attachment E]

Farm Size (number of acres under cultivation, in pasture and in woodlot)

Crops Grown

Farm Machines commonly used

Farm Labor (who did what/ how many people were needed)

Tasks to be done and by whom

RESEARCH QUESTIONS
for the MODERN ERA
[Attachment F]

1. How do the size of modern farms compare to the other two eras? Has the proportion of cultivated land to pasture and woodlot changed?

2. How does the amount of work done by hand compare between the Colonial period and the modern era? Do you think more time is saved by the use of machines today?

3. How many people are directly involved in the day to day operation of the farm? How many of these are family? Are there separate tasks assigned by gender in the modern era?

4. What advantages do modern farm machines have over the 19th century machines?

5. In what ways do you think life has improved for the modern farm/farmer compared to the Colonial period? In what ways do you think things have not improved?

YOUR QUESTIONS….??

SUGGESTED INTERVIEW QUESTIONS
[Attachment G]

1. How long has your family been involved in farming?
2. Has the size of your farm remained the same?
3. How many laborers work on the farm? Are they all family? Do boys and girls do the same farm tasks?
4. How much of the family income comes from off farm work?
5. What types of farm machinery do you own?
6. How long do you usually keep the different pieces of farm machinery?
7. Do you maintain/repair your machinery or is that hired out?
8. How many hours do you work on an average day?
9. Do you get much time off?
10. Do you think utilizing modern machinery affects the amount of time off that you have or don't have?

YOUR QUESTIONS….??

Technology Research Worksheet
[Attachment H]

Research the origins of the following farm machines. Look for the A) inventor/innovator, B) when patented,
C) description of the purpose of the machine, D) picture

Machine Inventor/Innovator patented
Description of Purpose

PLOW

HARROW

DISC-HARROW

STEEL PLOW

SCYTHE

GRAIN CRADLE

THRESHER

REAPER

MOWER

GRAIN DRILL
CHISEL PLOW

COMBINE

SELF PROPELLED REAPER

Machine Inventor/Innovator patented
Description of Purpose

STEAM TRACTOR

DIESAL TRACTOR

HAY RAKE

BALER

CULTIVATOR

America's Greatest History Attraction

High School Lesson Plan 1

Loretta Sovel, Gabriel Richard High School, Riverview, MI

Lesson Title: Changes in Household Technology Match Game

Grade Level: Adaptable to any

Overview: Designed to encourage students to study primary source evidence to evaluate changes in household technology and to assess the evidence for clues as to the changes in technological innovation for the household

Guiding Question: How has household technology changed in America and how can one use primary source evidence to assess the changes?

Objective: Students will:
a. use primary sources to determine changes in household technology
b. contrast technological household items from various time periods
c. compare photographic evidence with written source material to assess which evidence corresponds with which written source

Anticipated Challenges: Students may need guidance in how to closely examine the photographic primary evidence. Students with reading difficulty may need assistance in reading the written source material.

Materials: a. multiple copies of written descriptions of the houses at Greenfield Village, the Henry Ford, that are the object of the assignment (specifically, the Daggett Farm, the Susquehanna Plantation, the Firestone Farm, and the Henry Ford home)

b. overhead photographs of the Daggett Farm, the Susquehanna Plantation, the Firestone Farm, and the Henry Ford home

c. multiple copies of photographs of the areas of each house, primarily the cooking spaces, which students will evaluate for technological changes and to match with the correct house described above (photographs of the following may include but are not limited to: Daggett Farm – fireplace, cooking pots and lids and tools used to remove lids; Susquehanna Plantation– living room fireplace sealed and replaced with space heater; Firestone Farm - stove and stove top with focus on multiple burners; Henry Ford's childhood home – stove)

Note: photographs can be expanded to include other household items from each house – i.e. loom/sewing machine; kitchen sink/pump/faucets; lanterns, etc.)

Assessments:

Adaptable depending on grade level, but may include:

a. matching photographs with houses that they are taken from

b. matching photographs with houses that they are taken from, with a written response explaining rationale for matching photograph with house (rationale to be based on time period each house is from and evidence in the photo which

c. place the photographs in chronological order according to the time period that each represents

d. place the photographs in chronological order according to the time period each represents, with a written explanation of the technological conditions and/or changes observed between each photograph

e. if using multiple items from each house – match items with time period each are from; may include written assessment or rationale for matching each photograph with specified time periods

**** Note – the above assessments can be done in groups, pairs, or individually***

Instructional Sequence: Introduce students to concept of analyzing photographs of household items for evidence of technological advancement

Discuss with students the use of photographs as primary source evidence

Display on overhead photographs of each of the focus houses at Greenfield Village, with a discussion of each house

Distribute a copy of the written information of each house and a copy of the photographs of each household item

Conduct the chosen assessment from the list above

Class discussion with students, comparing which photographs they matched together, with which house, and why; what technological changes they observed within the household items in each house

Collect students' written responses as to why they matched each photograph, and what technological changes they observed between photographs

High School Lesson Plan 3

Michael Stratton, San Marcos High School, San Marcos, TX

Lesson Title: From Edison & Ford to Today's Energy and Environmental Concerns

Grade Level: 11th Grade US History

Overview: Class will examine the lives and accomplishments of Thomas Edison and Henry Ford with special emphasis on the invention of the incandescent light bulb and mass production of the automobile by means of a power point presentation and brief writing breaks to emphasize learning points. Another power point will be presented showing how the automobile and energy businesses, as well as the government, have attempted to fix some of the current energy issues. They will then examine the current energy/environmental situation using web-based information that points to the consumer driven use of these products. In groups, students will examine, present, and debate their findings.

Guiding Question: What factors have led to our current energy/environmental situation that evolved from the mass-production and use of electric lights and automobiles and how can we use practical problem-solving techniques to improve energy production while maintaining our environment? How much emphasis do we place on individual freedoms (market solutions) vs. the role of the government (laws and regulations) in improving our energy situation?

Learning Objectives: Students will become aware of the massive economic and social benefits of Edison's and Ford's accomplishments and how the course of history has brought us to examine the current energy/environmental situation in the context of those accomplishments.

Students will examine the law of unintended consequences regarding mass-production and mass-consumption versus government intervention in light of our current energy and environmental situation.

Students will use critical thinking inspired by the Edison/Ford legacy of practical problem-solving in addressing the controversial connections among industrialization and material (social, economic, and environmental) well-being.

Assessment: Students will have brief writing breaks during each power point lecture to assess what they know about Edison and Ford's accomplishments and how they have impacted society, as well as how energy and automobile production has impacted our environment. Students will be asked to share their thoughts with the class in an informal discussion generated by a "stand and deliver" activity where students stand up in agreement with statements and remain seated if they disagree. Random students will be asked to defend their positions on either side.

As a final assessment, groups of students will research energy topics from various standpoints and present their findings to the class. After these presentations, students will debate the merits of each of their findings and come to a consensus regarding what kinds of action we should take as citizens and come up with an energy policy that assigns responsibility to both the government and the free market in implementing these policies.

Key Concepts: Cause and effect of the Industrial Revolution
Changes over time
Social responsibility and the impact of technology
Core democratic values

Evidence/Sources: The first two sources will be in the form of power point lectures. The first lecture will be on the lives and accomplishments of Thomas Edison and Henry Ford and the impact they have had on our society using photos from Greenfield Village (me in a Model T!). The second will center on the current energy/environmental situation and the remedies offered by both the free market and the government. I will use parts of the Henry Ford website power point of the Ford Rouge plant's efforts to ease the environmental impact of its water runoff as an example of free market efforts to help the environment. The students will then use internet web sites to research energy topics, specifically <sage.tamu.edu>.

Time Frame: This lesson will take three days (block). The first to establish a framework of ideas through vocabulary, power points,

writing breaks, a quiz, and explanation of the group work to follow. The second day will center on computer research and note-taking in preparation for group presentations. The final day, students will present their findings and take part in the "stand and deliver" activity in order to generate debate.

Instructional Sequence: Students will begin with a list of vocabulary terms that will be used throughout the lesson (20 minutes). This will be followed by a power point describing the lives of Edison and Ford and their accomplishments with a brief writing break (3 minutes) after each man's description in order to reflect on what they have just learned (30 minutes total). Students will then take a brief short answer quiz using their notes. I will then introduce some ideas about our current energy and environmental concerns that have arisen from energy production and petroleum use with the light bulb and automobile as focus material. This will be a brief power point presentation followed by another writing break (3 minutes) that will be based on what they anticipate will be a useful energy policy for the U.S. and who will decide and implement it, the government or private enterprise. The lecture, writing break, and brief discussion will take about 30 minutes. The remaining 10 minutes will be devoted to breaking students into groups of 3 or 4 and explaining the upcoming research and presentation project, giving them a chart to organize pros and cons of their research topics. Topics will include: solar energy, biomass energy, ethanol, wind energy, nuclear energy, biodiesel, cap and trade, and CFLs, etc. Students will consider economic, social, political, and environmental impacts in their conclusions. Two minutes before the bell, I will hand out "exit slips." Students will write a quick response of what they learned in class and hand it to me as they leave the classroom. This can be done anonymously and can be used to generate a question and answer session at the beginning of the next class, refreshing the previous lesson that is at least two to three days prior due to the block schedule.

The second day is devoted to researching their topics and making presentations of their findings so that they will be ready to present and defend their positions the following day.

The final day will be for presentations and "stand and deliver" defense responses by the class. I will keep track of their conclusions on the board so students can respond to all the issues being represented and recognize where the

majority opinions lie, allowing them to come to some kind of consensus regarding an energy policy for the U.S.

Anticipated Challenges: Many of my students may not comprehend the economic or taxation aspects of their findings since many have parents who are economically disadvantaged and look to the government for their needs. The cost-benefits analyses may be over many of their heads for this reason. Also, the environment is an emotionally charged issue so that it will be difficult for some students to remain detached until all the information is presented and for this reason may argue with their hearts instead of their minds.

Curriculum Links: U.S. History Standards 6.1A and 6.1D.

Energy Policy Project

Group Members:

_____

Period: ____

Topic: _____

Description:

_____

_____

_____

_____

_____

PROS	CONS
Economic/Practical:	
Environmental:	
Social:	

Conclusions:

_____

_____

_____

America's Greatest History Attraction

Randy Nissen, Toledo Early College High School, Toledo, OH

High School Lesson Plan 4 Title of the Lesson/Activity: The Assembly Line and Its Consequences

Grade Level: 9th and 10th

Overview: This lesson will introduce students to the concepts of the American System (interchangeable parts, assembly line and mass production) and the social consequences of these changes.

Central Question: How did the assembly line change industrial production, and how did this change affect people's lives?

Learning Objectives:
1. Understand the evolution and importance of the American System (interchangeable parts, assembly line, mass production).

2. Realize that a new technology has social ramifications.

Assessment Tools: Pre-test – not graded. The purpose is to simply get kids thinking about the concepts they are going to learn.

Final project – THF website ExhibitBuilder project and written responses.

Key Concepts:
- -Interchangeable parts
- -Assembly line
- -Mass production
- -Vertical integration
- -Trade-offs

Evidence/Sources:
Textbook
Vocabulary sheet
PowerPoint presentations
The Henry Ford website

Modern Times (DVD) by Charlie Chaplin
À nous la liberté (DVD) by René Clair
Excerpts from *The Flivver King* by Upton Sinclair
Excerpts from Sorensen, Charles, E., *My Forty Years with Ford* (1956)
Five Things We Need to Know About Technological Change by Neil Postman (1998)

Duration: 6 days

Sequence of Instruction:

Day 1:

1. Pre-test (ungraded):
   a. List 5 things in the classroom that are made by machines.
   b. List anything in the room that is handmade.
   c. How would you fix your car if you drove over a curb and destroyed your exhaust system?
2. Show a slide of the Model T, and see what your students know or think they know.
3. Read the section in your textbook that refers to Henry Ford. This will give kids a context or broad framework from which to proceed.
4. Interactive PPT lecture/discussion Assembly line ppt)
5. HW: Create a Venn diagram comparing the American System with making things by hand.

Day 2:

1. Create an exhibit on ExhibitBuilder that tells the story of Henry Ford and the assembly line http://collections.thehenryford.org/ExhibitHome.aspx

Day 3:

1. Introduce the two films with the ppt.
2. View clips from *Modern Times* and *À nous la liberté*.

Modern Times Clips
Show first 6 minutes:
Sheep/workers
Speeding up assembly line

6:02	Automatic feeding machine
8:42–12:52	Chaplin using feeding machine
13:01	Famous gear scene
18:03	Red flag
1:15:50	Chaplin speaks

Homage to Chaplin

I Love Lucy "Job Switching"
http://www.youtube.com/watch?v=8NPzLBSBzPI

Drake and Josh Sushi roll
http://www.youtube.com/watch?v=FfIsD1wEOnw

À nous la liberté Clips

1:30-6:45	Prison/assembly line
15:30-17:42	Assembly line scene

3. Discuss what the films were trying to say.

Day 4:

1. Introduction to the two authors with ppt.
2. Read excerpts from *The Flivver King* by Upton Sinclair and *My Forty Years with Ford* by Charles Sorensen.
3. Complete written questions.
4. Do a T-chart as a class eliciting responses showing the positive and negative consequences of the assembly line.
5. HW: Read *Five Things We Need to Know About Technological Change* by Neil Postman (1998)
   Assignment: Respond to each of Postman's 5 ideas in the context of working on the assembly line as a new form of technology. Did Postman nail it?

Day 6:

1. Discuss Postman's theses in the context of Henry Ford's assembly line.

Student Project Ideas:

-Write responses to the ExhibitBuilder projects as if you were a Ford line worker, an efficiency excerpt, an African-American worker, a master craftsman, i.e, multiple perspectives.
-Investigate the use of the assembly line in other industries. Where do you see evidence of the assembly line and the American System in your daily life?

Curriculum Links:

Revised Ohio Social Studies Content Standards

Topic: Industrialization and Progressivism (1877-1920)

Ignited by post-Civil War demand and fueled by technological advancements, large-scale industrialization began in the United States during the late 1800s. Growing industries enticed foreign immigration, fostered urbanization, gave rise to the American labor movement and developed the infrastructure that facilitated the settling of the West. A period of progressive reform emerged in response to political corruption and practices of big
business.

Content Statements:

5. The rise of corporations, heavy industry, mechanized farming and technological innovations transformed the American economy from an agrarian to an increasingly urban industrial society.

6. The rise of industrialization led to a rapidly expanding workforce. Labor organizations grew amidst unregulated working conditions, laissez-faire policies toward big business and violence toward supporters of organized labor.

7. Immigration, internal migration and urbanization transformed American life.

8. Following Reconstruction, old political and social structures reemerged, and racial discrimination was institutionalized.

9. The Progressive era was an effort to address the ills of American society stemming from industrial capitalism, urbanization and political corruption.

Who is the most recognizable person in the world today?

In the early
20th-century
it was . . .

Charlie
Chaplin
1889-1977

1936

The Great Dictator
1940

À nous la liberté
"Liberty for Us":

1931

Charles Sorenson
1881-1968

Upton Sinclair
1878-1968

1906

1937

Two Readings Related to Henry Ford and the Assembly Line

Birth of the Assembly Line

"What was worked out at Ford was the practice of moving the work from one worker to another until it became a complete unit, then arranging the flow of these units at the right time and the right place to a moving final assembly line from which came a finished product. Regardless of earlier uses of some of these principles, the direct line of succession of mass production and its intensification into automation stems directly from what we worked out at Ford Motor Company between 1908 and 1913...

The idea occurred to me that assembly would be easier, simpler, and faster if we moved the chassis along, beginning at one end of the plant with a frame and adding the axles and the wheels; then moving it past the stockroom, instead of moving the stockroom to the chassis. I had Lewis arrange the materials on the floor so that what was needed at the start of assembly would be at that end of the building and the other parts would be along the line as we moved the chassis along. We spent every Sunday during July planning this. Then one Sunday morning, after the stock was laid out in this fashion, Lewis and I and a couple of helpers put together the first car, I'm sure, that was ever built on a moving line.

We did this simply by putting the frame on skids, hitching a towrope to the front end and pulling the frame along until axles and wheels were put on. Then we rolled the chassis along in notches to prove what could be done. While demonstrating this moving line, we worked on some of the subassemblies, such as completing a radiator with all its hose fittings so that we could place it very quickly on the chassis. We also did this with the dash and mounted the steering gear and the spark coil."

"By August, 1913, all links in the chain of moving assembly lines were complete except the last and most spectacular one - the one we had first experimented with one Sunday morning just five years before. Again a towrope was hitched to a chassis, this time pulled by a capstan. Each part was attached to the moving chassis in order, from axles at the beginning to bodies at the end of the line. Some parts took longer to attach than others; so, to keep an even pull on the towrope, there must be differently spaced intervals between delivery of the parts along the line. This called for patient timing and rearrangement until the flow of parts and the speed and intervals along the assembly line meshed into a perfectly synchronized operation throughout all stages of production. Before the end of the year a power-driven assembly line was in operation, and New Year's saw three more installed. Ford mass production and a new era in industrial history had begun"

References:
Sorensen, Charles, E., *My Forty Years with Ford* (1956)

Questions - Write these on a separate paper. Use complete sentences.

First Reading: Henry Ford Changes the World, 1908

1. How were cars manufactured before the assembly line was invented?

2. Describe the basic idea of an **assembly line**.

3. Look up the word **efficient.** How did the assembly line make the manufacture of cars more efficient?

4. What else would you like to know about Henry Ford or the Model T?

told to go and get his "time". There he was, after twenty-two years of merit and faithful service, deprived of all his honors and emoluments by a miserable straw-boss who had been with the company only a couple of years, and had never had so much as a nod from Henry Ford in his life. When Abner, in horrified protest, mentioned that he knew Mr. Ford, the man laughed in his face and told him to go straight to Henry's home on the River Rouge and complain!

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What Abner had to do was to go to his son, who managed to persuade somebody in the tool-shop to find his old man a place. The only vacancy was tending some grinding-machines; so Abner was on his feet again, feeding pieces of steel, all of uniform size and shape to the ten thousandth part of an inch, into machines which cut a groove in one side of them; Abner had to move from one machine to another, and when he finished at the last one, run back to the first, while the boss shouted: "Get a move on you, Shutt; we can't afford to have them grinders standing idle!"

Abner hadn't worked on his feet for years, and his legs had grown soft and his belly hung down in front. His calves began to hurt, and at night they were so swollen that he could hardly get to sleep. He didn't think he could stand it; but he had to stand it, because it was his living, his only chance. He was forty-eight years of age now, and had a boss who boasted in the magazines of kindness to his aged employees; if there was any other corporation head in America who made such a claim, it hadn't come to Abner's attention, and if he got himself a reputation at Ford's for being a weakling and grumbler, how would he ever complete the payments on his new car?

It was those dreadful devices known as "the speed-up" and "the stretch-out." Every worker had to be strained to the uttermost limit, every one had to be giving the last ounce of energy he had in his carcass. Henry Ford would deny that; of course; he would write so blandly, so convincingly, about the purpose of scientific management being to ascertain exactly what each worker could do without strain, and to give him that much. It was a lie, it was a lie! Henry's workers wanted to scream when they read those articles of his. They were tired when they started in the morning, and when they quit they were grey and staggering with fatigue, they were empty shells out of which the last drop of juice had been squeezed.

It was that way everywhere, not merely at Ford's, but all through the cruel industry. Faster and faster, until the hearts of the men were seething with bitterness. All the motor-plants were in deadly incessant competition; every department in every plant competing with others, and with itself, with its own records in the past, with new "norms" which had been set by the engineers who watched the processes and designed new machines and techniques.

Did Henry Ford know about these conditions? Abner Shutt, faithful devotee, was sure that he couldn't know. Abner could read in the papers what the Flivver King was doing. He was traveling in Europe, inspecting his vast empire, and telling the people over

there how to Americanize themselves. He was in Georgia, experimenting with fifteen thousand acres of golden-rod from which he expected to get rubber. He was on his huge farm in Michigan, growing soybeans, and watching his laboratory people making steering-wheels out of them. He was compiling his dance-book and collecting antiques for his museum. He was studying the thousands of birds for which he had provided air-conditioned homes. He was going everywhere and doing everything except watching the assembly-lines of his huge factory, with two hundred thousand slaves making themselves parts of machines—pick-up, push-in, turn, reverse—pick-up, push-in, turn, reverse, pickuppushinturnreverse, pickuppushinturnreverse—a man would go mad if he stopped to think about it.

Abner Shutt, patient and spavined old nag of industry, trotted back and forth in his treadmill, never daring to lift his eyes for one moment during eight hours, except for the exactly-measured fifteen minutes when the "ptomaine wagon" came along, selling fifteen-cent lunches for those who hadn't brought their own. Abner did his work, and held his tongue; he remembered the copy-book maxims about merit and faithfulness, and his lifetime devotion warred against the everyday facts about him, the bitter sneers he heard from the men—always under their breaths, of course, on account of the spies and stool-pigeons of the "service department".

But one thing Abner couldn't do, not even to oblige his kind boss, and that was to dance old-fashioned square dances after he got home from his work.

Second Reading: **Excerpt from *The Flivver King*, Upton Sinclair, 1937.**

1. What were some ways that Henry Ford tried to get more out of his workers?

2. Why did Abner describe the Ford workers on the assembly line as " slaves making themselves parts of the machines"?

3. Earlier in the short novel Abner is hired by Henry Ford who he idolizes. By the time of this selection Abner has been forced by circumstances to go back to work at the age of 48. Has his perception of Henry Ford changed?

4. Define at least three words from this excerpt that you had to look up.

5. The first reading included passages from a former Ford engineer who worked in an office. The second was from the perspective of a factory line worker. How do their perspectives differ?

Neil Postman: Five Things We Need to Know About Technological Change (1998)

Good morning your Eminences and Excellencies, ladies, and gentlemen.

The theme of this conference, "The New Technologies and the Human Person: Communicating the Faith in the New Millennium," suggests, of course, that you are concerned about what might happen to faith in the new millennium, as well you should be. In addition to our computers, which are close to having a nervous breakdown in anticipation of the year 2000, there is a great deal of frantic talk about the 21st century and how it will pose for us unique problems of which we know very little but for which, nonetheless, we are supposed to carefully prepare. Everyone seems to worry about this–business people, politicians, educators, as well as theologians.

At the risk of sounding patronizing, may I try to put everyone's mind at ease? I doubt that the 21st century will pose for us problems that are more stunning, disorienting or complex than those we faced in this century, or the 19th, 18th, 17th, or for that matter, many of the centuries before that. But for those who are excessively nervous about the new millennium, I can provide, right at the start, some good advice about how to confront it. The advice comes from people whom we can trust, and whose thoughtfulness, it's safe to say, exceeds that of President Clinton, Newt Gingrich, or even Bill Gates. Here is what Henry David Thoreau told us: "All our inventions are but improved means to an unimproved end." Here is what Goethe told us: "One should, each day, try to hear a little song, read a good poem, see a fine picture, and, if possible, speak a few reasonable words." Socrates told us: "The unexamined life is not worth living." Rabbi Hillel told us: "What is hateful to thee, do not do to another." And here is the prophet Micah: "What does the Lord require of thee but to do justly, to love mercy and to walk humbly with thy God." And I could say, if we had the time, (although you know it well enough) what Jesus, Isaiah, Mohammad, Spinoza, and Shakespeare told us. It is all the same: There is no escaping from ourselves. The human dilemma is as it has always been, and it is a delusion to believe that the technological changes of our era have rendered irrelevant the wisdom of the ages and the sages.

Nonetheless, having said this, I know perfectly well that because we do live in a technological age, we have some special problems that Jesus, Hillel, Socrates, and Micah did not and could not speak of. I do not have the wisdom to say what we ought to do about such problems, and so my contribution must confine itself to some things we need to know in order to address the problems. I call my talk Five Things We Need to Know About Technological Change. I base these ideas on my thirty years of studying the history of technological change but I do not think these are academic or esoteric ideas. They are to the sort of things everyone who is concerned with cultural stability and balance should know and I offer them to you in the hope that you will find them useful in thinking about the effects of technology on religious faith.

First Idea

The first idea is that all technological change is a trade-off. I like to call it a Faustian bargain. Technology giveth and technology taketh away. This means that for every advantage a new technology offers, there is always a corresponding disadvantage. The disadvantage may exceed in importance the advantage, or the advantage may well be worth the cost. Now, this may seem to be a rather obvious idea, but you would be surprised at how many people believe that new technologies are unmixed blessings. You need only think of the enthusiasms

with which most people approach their understanding of computers. Ask anyone who knows something about computers to talk about them, and you will find that they will, unabashedly and relentlessly, extol the wonders of computers. You will also find that in most cases they will completely neglect to mention any of the liabilities of computers. This is a dangerous imbalance, since the greater the wonders of a technology, the greater will be its negative consequences.

Think of the automobile, which for all of its obvious advantages, has poisoned our air, choked our cities, and degraded the beauty of our natural landscape. Or you might reflect on the paradox of medical technology which brings wondrous cures but is, at the same time, a demonstrable cause of certain diseases and disabilities, and has played a significant role in reducing the diagnostic skills of physicians. It is also well to recall that for all of the intellectual and social benefits provided by the printing press, its costs were equally monumental. The printing press gave the Western world prose, but it made poetry into an exotic and elitist form of communication. It gave us inductive science, but it reduced religious sensibility to a form of fanciful superstition. Printing gave us the modern conception of nationhood, but in so doing turned patriotism into a sordid if not lethal emotion. We might even say that the printing of the Bible in vernacular languages introduced the impression that God was an Englishman or a German or a Frenchman–that is to say, printing reduced God to the dimensions of a local potentate.

Perhaps the best way I can express this idea is to say that the question, "What will a new technology do?" is no more important than the question, "What will a new technology undo?" Indeed, the latter question is more important, precisely because it is asked so infrequently. One might say, then, that a sophisticated perspective on technological change includes one's being skeptical of Utopian and Messianic visions drawn by those who have no sense of history or of the precarious balances on which culture depends. In fact, if it were up to me, I would forbid anyone from talking about the new information technologies unless the person can demonstrate that he or she knows something about the social and psychic effects of the alphabet, the mechanical clock, the printing press, and telegraphy. In other words, knows something about the costs of great technologies.

Idea Number One, then, is that culture always pays a price for technology.

Second Idea

This leads to the second idea, which is that the advantages and disadvantages of new technologies are never distributed evenly among the population. This means that every new technology benefits some and harms others. There are even some who are not affected at all. Consider again the case of the printing press in the 16th century, of which Martin Luther said it was "God's highest and extremest act of grace, whereby the business of the gospel is driven forward." By placing the word of God on every Christian's kitchen table, the mass-produced book undermined the authority of the church hierarchy, and hastened the breakup of the Holy Roman See. The Protestants of that time cheered this development. The Catholics were enraged and distraught. Since I am a Jew, had I lived at that time, I probably wouldn't have given a damn one way or another, since it would make no difference whether a pogrom was inspired by Martin Luther or Pope Leo X. Some gain, some lose, a few remain as they were.

Let us take as another example, television, although here I should add at once that in the case of television

there are very few indeed who are not affected in one way or another. In America, where television has taken hold more deeply than anywhere else, there are many people who find it a blessing, not least those who have achieved high-paying, gratifying careers in television as executives, technicians, directors, newscasters and entertainers. On the other hand, and in the long run, television may bring an end to the careers of school teachers since school was an invention of the printing press and must stand or fall on the issue of how much importance the printed word will have in the future. There is no chance, of course, that television will go away but school teachers who are enthusiastic about its presence always call to my mind an image of some turn-of-the-century blacksmith who not only is singing the praises of the automobile but who also believes that his business will be enhanced by it. We know now that his business was not enhanced by it; it was rendered obsolete by it, as perhaps an intelligent blacksmith would have known.

The questions, then, that are never far from the mind of a person who is knowledgeable about technological change are these: Who specifically benefits from the development of a new technology? Which groups, what type of person, what kind of industry will be favored? And, of course, which groups of people will thereby be harmed?

These questions should certainly be on our minds when we think about computer technology. There is no doubt that the computer has been and will continue to be advantageous to large-scale organizations like the military or airline companies or banks or tax collecting institutions. And it is equally clear that the computer is now indispensable to high-level researchers in physics and other natural sciences. But to what extent has computer technology been an advantage to the masses of people? To steel workers, vegetable store owners, automobile mechanics, musicians, bakers, bricklayers, dentists, yes, theologians, and most of the rest into whose lives the computer now intrudes? These people have had their private matters made more accessible to powerful institutions. They are more easily tracked and controlled; they are subjected to more examinations, and are increasingly mystified by the decisions made about them. They are more than ever reduced to mere numerical objects. They are being buried by junk mail. They are easy targets for advertising agencies and political institutions.

In a word, these people are losers in the great computer revolution. The winners, which include among others computer companies, multi-national corporations and the nation state, will, of course, encourage the losers to be enthusiastic about computer technology. That is the way of winners, and so in the beginning they told the losers that with personal computers the average person can balance a checkbook more neatly, keep better track of recipes, and make more logical shopping lists. Then they told them that computers will make it possible to vote at home, shop at home, get all the entertainment they wish at home, and thus make community life unnecessary. And now, of course, the winners speak constantly of the Age of Information, always implying that the more information we have, the better we will be in solving significant problems–not only personal ones but large-scale social problems, as well. But how true is this? If there are children starving in the world–and there are–it is not because of insufficient information. We have known for a long time how to produce enough food to feed every child on the planet. How is it that we let so many of them starve? If there is violence on our streets, it is not because we have insufficient information. If women are abused, if divorce and pornography and mental illness are increasing, none of it has anything to do with insufficient information. I dare say it is because something else is missing, and I don't think I have to tell this audience what it is. Who knows? This age of information may turn out to be a curse if we are blinded by it so that we cannot see truly where our problems lie. That is why it is always necessary for us to ask of those who speak enthusiastically of computer technology, why do you do this?

What interests do you represent? To whom are you hoping to give power? From whom will you be withholding power?

I do not mean to attribute unsavory, let alone sinister motives to anyone. I say only that since technology favors some people and harms others, these are questions that must always be asked. And so, that there are always winners and losers in technological change is the second idea.

Third Idea

Here is the third. Embedded in every technology there is a powerful idea, sometimes two or three powerful ideas. These ideas are often hidden from our view because they are of a somewhat abstract nature. But this should not be taken to mean that they do not have practical consequences.

Perhaps you are familiar with the old adage that says: To a man with a hammer, everything looks like a nail. We may extend that truism: To a person with a pencil, everything looks like a sentence. To a person with a TV camera, everything looks like an image. To a person with a computer, everything looks like data. I do not think we need to take these aphorisms literally. But what they call to our attention is that every technology has a prejudice. Like language itself, it predisposes us to favor and value certain perspectives and accomplishments. In a culture without writing, human memory is of the greatest importance, as are the proverbs, sayings and songs which contain the accumulated oral wisdom of centuries. That is why Solomon was thought to be the wisest of men. In Kings I we are told he knew 3,000 proverbs. But in a culture with writing, such feats of memory are considered a waste of time, and proverbs are merely irrelevant fancies. The writing person favors logical organization and systematic analysis, not proverbs. The telegraphic person values speed, not introspection. The television person values immediacy, not history. And computer people, what shall we say of them? Perhaps we can say that the computer person values information, not knowledge, certainly not wisdom. Indeed, in the computer age, the concept of wisdom may vanish altogether.

The third idea, then, is that every technology has a philosophy which is given expression in how the technology makes people use their minds, in what it makes us do with our bodies, in how it codifies the world, in which of our senses it amplifies, in which of our emotional and intellectual tendencies it disregards. This idea is the sum and substance of what the great Catholic prophet, Marshall McLuhan meant when he coined the famous sentence, “The medium is the message.”

Fourth Idea

Here is the fourth idea: Technological change is not additive; it is ecological. I can explain this best by an analogy. What happens if we place a drop of red dye into a beaker of clear water? Do we have clear water plus a spot of red dye? Obviously not. We have a new coloration to every molecule of water. That is what I mean by ecological change. A new medium does not add something; it changes everything. In the year 1500, after the printing press was invented, you did not have old Europe plus the printing press. You had a different Europe. After television, America was not America plus television. Television gave a new coloration to every political campaign, to every home, to every school, to every church, to every industry, and so on.

That is why we must be cautious about technological innovation. The consequences of technological change are always vast, often unpredictable and largely irreversible. That is also why we must be suspicious of capitalists.

Capitalists are by definition not only personal risk takers but, more to the point, cultural risk takers. The most creative and daring of them hope to exploit new technologies to the fullest, and do not much care what traditions are overthrown in the process or whether or not a culture is prepared to function without such traditions. Capitalists are, in a word, radicals. In America, our most significant radicals have always been capitalists–men like Bell, Edison, Ford, Carnegie, Sarnoff, Goldwyn. These men obliterated the 19th century, and created the 20th, which is why it is a mystery to me that capitalists are thought to be conservative. Perhaps it is because they are inclined to wear dark suits and grey ties.

I trust you understand that in saying all this, I am making no argument for socialism. I say only that capitalists need to be carefully watched and disciplined. To be sure, they talk of family, marriage, piety, and honor but if allowed to exploit new technology to its fullest economic potential, they may undo the institutions that make such ideas possible. And here I might just give two examples of this point, taken from the American encounter with technology. The first concerns education. Who, we may ask, has had the greatest impact on American education in this century? If you are thinking of John Dewey or any other education philosopher, I must say you are quite wrong. The greatest impact has been made by quiet men in grey suits in a suburb of New York City called Princeton, New Jersey. There, they developed and promoted the technology known as the standardized test, such as IQ tests, the SATs and the GREs. Their tests redefined what we mean by learning, and have resulted in our reorganizing the curriculum to accommodate the tests.

A second example concerns our politics. It is clear by now that the people who have had the most radical effect on American politics in our time are not political ideologues or student protesters with long hair and copies of Karl Marx under their arms. The radicals who have changed the nature of politics in America are entrepreneurs in dark suits and grey ties who manage the large television industry in America. They did not mean to turn political discourse into a form of entertainment. They did not mean to make it impossible for an overweight person to run for high political office. They did not mean to reduce political campaigning to a 30-second TV commercial. All they were trying to do is to make television into a vast and unsleeping money machine. That they destroyed substantive political discourse in the process does not concern them.

Fifth Idea

I come now to the fifth and final idea, which is that media tend to become mythic. I use this word in the sense in which it was used by the French literary critic, Roland Barthes. He used the word “myth” to refer to a common tendency to think of our technological creations as if they were God-given, as if they were a part of the natural order of things. I have on occasion asked my students if they know when the alphabet was invented. The question astonishes them. It is as if I asked them when clouds and trees were invented. The alphabet, they believe, was not something that was invented. It just is. It is this way with many products of human culture but with none more consistently than technology. Cars, planes, TV, movies, newspapers–they have achieved mythic status because they are perceived as gifts of nature, not as artifacts produced in a specific political and historical context.

When a technology become mythic, it is always dangerous because it is then accepted as it is, and is therefore not easily susceptible to modification or control. If you should propose to the average American that television broadcasting should not begin until 5 PM and should cease at 11 PM, or propose that there should be no televi-

sion commercials, he will think the idea ridiculous. But not because he disagrees with your cultural agenda. He will think it ridiculous because he assumes you are proposing that something in nature be changed; as if you are suggesting that the sun should rise at 10 AM instead of at 6.

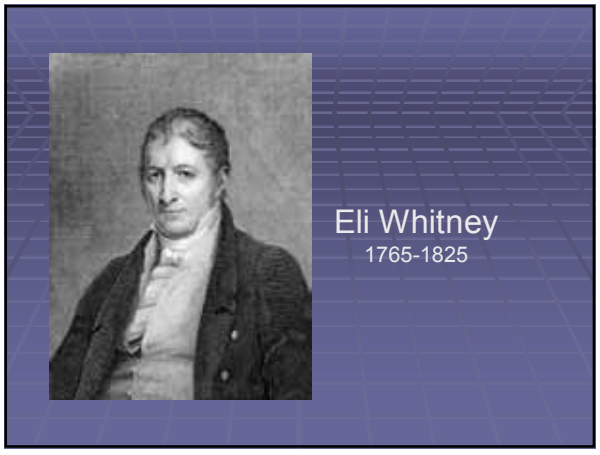
Whenever I think about the capacity of technology to become mythic, I call to mind the remark made by Pope John Paul II. He said, "Science can purify religion from error and superstition. Religion can purify science from idolatry and false absolutes."

What I am saying is that our enthusiasm for technology can turn into a form of idolatry and our belief in its beneficence can be a false absolute. The best way to view technology is as a strange intruder, to remember that technology is not part of God's plan but a product of human creativity and hubris, and that its capacity for good or evil rests entirely on human awareness of what it does for us and to us.

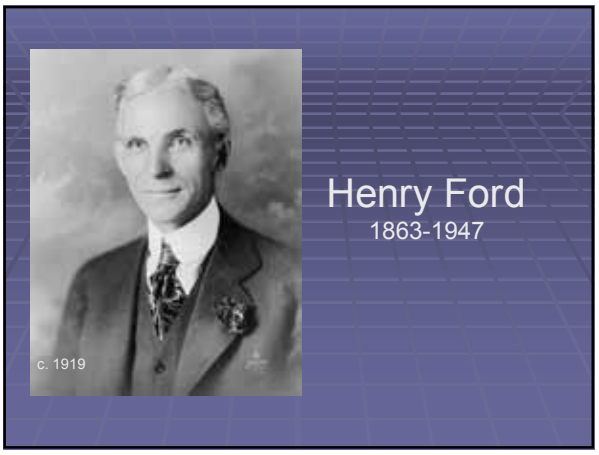
Conclusion

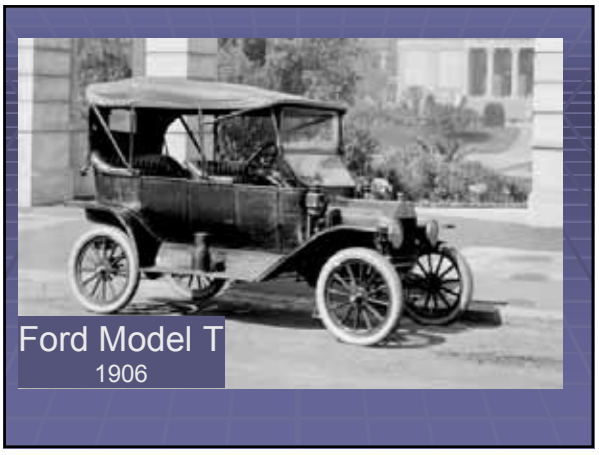
And so, these are my five ideas about technological change. First, that we always pay a price for technology; the greater the technology, the greater the price. Second, that there are always winners and losers, and that the winners always try to persuade the losers that they are really winners. Third, that there is embedded in every great technology an epistemological, political or social prejudice. Sometimes that bias is greatly to our advantage. Sometimes it is not. The printing press annihilated the oral tradition; telegraphy annihilated space; television has humiliated the word; the computer, perhaps, will degrade community life. And so on. Fourth, technological change is not additive; it is ecological, which means, it changes everything and is, therefore, too important to be left entirely in the hands of Bill Gates. And fifth, technology tends to become mythic; that is, perceived as part of the natural order of things, and therefore tends to control more of our lives than is good for us.

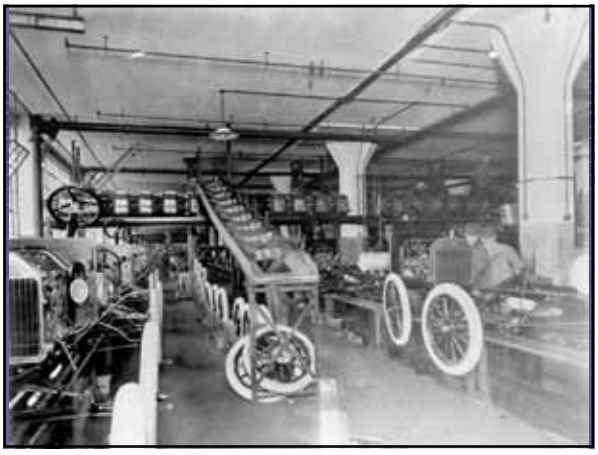
If we had more time, I could supply some additional important things about technological change but I will stand by these for the moment, and will close with this thought. In the past, we experienced technological change in the manner of sleep-walkers. Our unspoken slogan has been "technology über alles," and we have been willing to shape our lives to fit the requirements of technology, not the requirements of culture. This is a form of stupidity, especially in an age of vast technological change. We need to proceed with our eyes wide open so that we many use technology rather than be used by it.

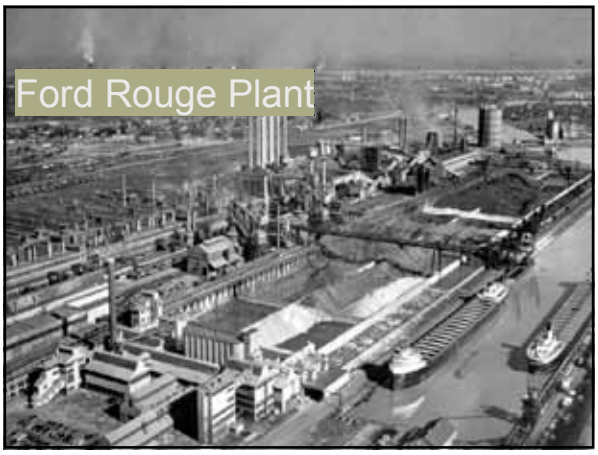


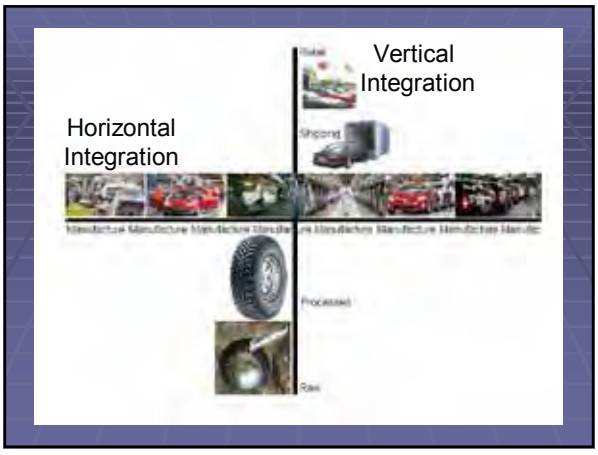
Interchangeable Parts

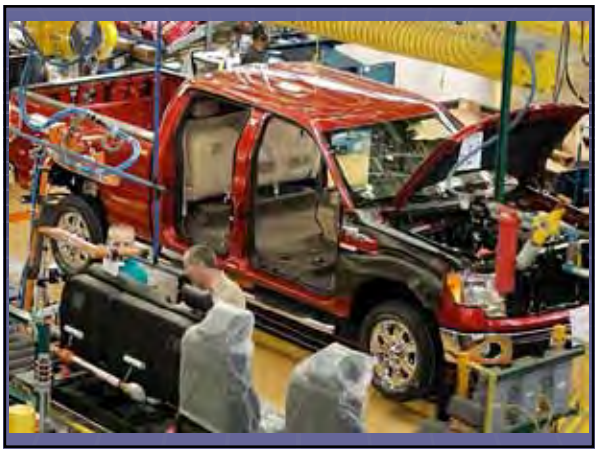












America's Greatest History Attraction

High School Lesson Plan 5

Jessica Meyer, Mesquite Jr. High, Gilbert, AZ

Lesson Plan Title: The Industrial Revolution: A Blessing or a Curse?

Grade Level: Adaptable for grades 7 - 12

Overview: Students will consider how the Industrial Revolution affected the lives of Americans in the areas of family relationships, ease of life, and health and environment.

Central Question: To what extent did the technological advancements of the Industrial Revolution improve the lives of Americans in the areas of family relationships, ease of life, and health and environment? To what extent might these advancements have had a negative effect?

Learning Objectives: Students will understand and then think critically about social and technological advancements and trends in 19th century history, as well as how they continue to affect modern society.

Assessment Tools: Students will create a PowerPoint presentation to relay their findings and opinions to the class, after which, the class will participate in a debate regarding the overall effects of the Industrial Revolution on modern America.

Key Concepts: The evolution of technology during the 19th and early 20th century and its affect on family life, ease of life, and health and environment.

Evidence/ Sources: Students will use evidence on-site at the Greenfield Village and/or the Henry Ford Museum

Time Frame: The project will require one day at Greenfield Village and/or the Henry Ford Museum, two to three class periods to create PowerPoint presentations, one to two periods to present, and one period to debate the findings and reflect.

Instructional Sequence: The class will be divided up into groups, with each group gathering information on how technology and the Industrial

Revolution have affected their specific topic. More than one group may be assigned each topic. The topics include family relationships, ease of life, and health and environment.

The students will be assigned digital cameras.

The students will be encouraged to explore the exhibits at the Henry Ford Museum and Greenfield Village and question the staff, keeping in mind that their goal is to use the cameras and take notes to document how technology affected their specific topic.

The students will review their notes, download the photos that they decide are most useful to their topic, and try to formulate an opinion regarding the extent to which the Industrial Revolution affected the lives of Americans (restrict them to their specific topic area) positively or negatively.

The students will use their photos and notes to make a case for their argument by creating a PowerPoint presentation with their group members.

The students will present their PowerPoint presentation to the class.

The class will be allowed time to debate the overall positive or negative impact of the Industrial Revolution on different aspects of the lives of Americans.

Each individual will be asked to write a personal reflection explaining their opinions of the Industrial Revolution's impact on each area of Americans' lives.

Student Project Ideas*:* Project includes photo documentation, PowerPoint, debate, and personal reflection, but cold be altered to create a photo portfolio and analysis of findings.

Anticipated Challenges: Depending on the students' familiarity with technology, they may need extra guidance downloading pictures and using them to create a PowerPoint. Students may also find it difficult to consider the negative effects of technology. Finally, remind students to consider ALL Americans, when tackling this project. Ask them to think about men, women, and children, as well as Americans from different ethnic backgrounds.

Curriculum Links:

Strand 1: Historical Perspective
- Standard I.I Time and Chronology
- Standard I.2 Comprehending the Past
- Standard I.3 Analyzing and Interpreting the Past
- Standard I.4 Judging Decisions from the Past

Strand II. Geographic Perspective
- Standard II.2 Human/Environment Interaction

Strand IV. Economic Perspective
- Standard IV.I Individual and Household Choices
- Standard IV.2 Business Choices

Strand V. Inquiry
- Standard V.I Information Processing
- Standard V.2 Conducting Investigations

Strand VI. Public Discourse and Decision Making
- Standard VI.2 Group Discussion

America's Greatest History Attraction®

High School Lesson Plan 6

Joseph Cislo, Northville High School, Northville, MI
Thomas Gunnells, Camden Frontier High School, Camden, MI
Toni Simovski, South Lyon High School, South Lyon, MI

Title of the Lesson: To Cure All Ailments: Patent Medicine and the Industrial Revolution

Grade Level: 9-12

Overview: Examining the impact of the Industrial Revolution on medicine in the Nineteenth and early Twentieth Centuries.

Central Question: How did advancements in technology change attitudes toward medicine?

Learning Objectives: Students will:
Examine the nature/types of medicine dispensed in the early 19th century.
Consider positive and negative qualities of pre-industrial attitudes toward medicine.
Appreciate the ways in which technology affected medicine in the late 19th and early 20th centuries.
Realize connections between the impact of technology on pre-industrial medicine and modern medical practice.

Assessment Tools: Informal discussion; collaborative and individual written responses.

Key Concepts: Traditional herbal medicines, patent medicines, industrialization/ standardization/ quantification, scientific methods, the Pure Food and Drug Act of 1906, professional licensing

Evidence Sources: "Plants in The Dr. Howard Garden" handout, the Pure Food and Drug Act of 1906, Patent Medicine examples, Lydia E. Pinkham Medicine Company records.

Time Frame: 1-2 days

Instructional Sequence:

1. INTRO ACTIVITY—"YOU BE THE DOCTOR"
On an overhead projector, display the following list of maladies with an adjacent blank line and ask the class to identify an appropriate modern medicinal response to the problems:

RELIEF OF HEADACHES	_____	(basil)
INTESTINAL CRAMPS	_____	(catnip)
DECONGESTIVE	_____	(cayenne pepper)
SEDATIVE	_____	(lavender)
SOOTHING WOUNDS	_____	(St. John's wort)
POWERFUL SEDATIVE	_____	(valerian)

It is likely that students will identify a number of modern medicines—Sudafed, aspirin, etc.—to address these maladies. The traditional or pre-industrial herbal medicines (listed above in parentheses) are available in the "Plants in Dr. Howard's Garden" handout, which also includes a medical advisory about using these substances for these purposes. The teacher may read over the whole list of herbal remedies with the class, or focus on several interesting examples.

Then, the teacher should ask students about the provenance of the modern medicines they identified. Where do they come from? How are they made? Under what conditions are modern medicines produced? It is likely that, after guided discussion, students will identify a sterile chemical factory as the source of modern medicine production. Share the back of the "Dr. Howard's Garden" handout, which displays his private medicinal garden and ask students about their thoughts and feelings on using this as a source of the medicine that would cure their ills.

2. COLLABORATIVE ACTIVITY—PATENT MEDICINES OF THE 19TH CENTURY

The teacher will then hand out or display examples of patent medicine of the late 19th century, before the advent of government regulation of medicine. As a class, go over the Ayer's Sarsaparilla advertising card and text, examining the claims made in relation to the product. http://www.mc.vanderbilt.edu/biolib/hc/nostrums/ayers.html Then, do the same with the advertising material for Dr. Morse's Indian Root Pills, including the accompanying testimonials purportedly from satisfied customers. http://www.mc.vanderbilt.edu/biolib/hc/nostrums/morse.html
After this large-group work is done, pairs or small groups of students will work with the idea of advertising patent medicines. Students may use given examples or make up their own medicines, emulating the outrageous claims made by these products. A few possible true examples are:
Horsford's Acid Phosphate
(http://www.hagley.lib.de.us/library/exhibits/patentmed/items/horsfords.html)
G. G. Green's August Flower German Syrup
(http://www.hagley.lib.de.us/library/exhibits/patentmed/items/witwisdom.html)
For either the invented or the historical product, students will be expected to devise a set of claims for the product, as well as a letter from a customer.

3. BRIEF LECTURE—THE LYDIA E. PINKHAM MEDICINE CO.

The Lydia E. Pinkham Medicine Company was one of the most successful of the old patent medicine companies. Her vegetable compound was marketed to deal with "female matters," became a mainstay of the patent medicine business and is still available today. Brief summaries of the company's history and advertising are available at the following websites:
(http://www.mc.vanderbilt.edu/biolib/hc/nostrums/pinkham.html)
(http://ocp.hul.harvard.edu/ww/pinkham.html#arc)

4. INDIVIDUAL ACTIVITY—THE PURE FOOD AND DRUG ACT OF 1906

Read excerpts and use it to craft a response to Pinkham's Vegetable Compound.
Optional link: http://www.fda.gov/regulatoryinformation/legislation/ucm148690.htm

5. OPTIONAL EXTENDED RESEARCH—HERBAL MEDICINE IN THE MODERN WORLD

For an optional continuation activity, students can research the prevalence of homeopathic medicine and herbal remedies in the modern world. In doing so, students could consider the licensing of these remedies, the position the Food and Drug Administration has taken on them, and the positive and negative results that have emerged with their use.

Student Project Ideas: Surveys on medicine, summarize changes in lifestyle, newspaper column on laws enacted.

Anticipated Challenges: Students may encounter difficulties with the following
- Understanding the different forms of herbs & plants
- Understanding knowledge of current medications
- Understanding primary source documents
- Understanding licensing processes between the States

Curriculum Links: MI US History HSCE's:
6.1.1 **Factors in the American Industrial Revolution** – Analyze the factors that enabled the United States to become a major industrial power
6.1.5 **A Case Study of American Industrialism** – Using the automobile industry as a case study, analyze the causes and consequences of this major industrial transformation by explaining
6.3.1 **Social Issues** – Describe at least three significant problems or issues created by America's industrial and urban transformation between 1895 and 1930 (e.g., urban and rural poverty and blight, child labor immigration, political corruption, public health, poor working conditions, and monopolies).
6.3.2 **Causes and Consequences of Progressive Reform** – Analyze the causes, consequences, and limitations of Progressive reform in the following areas
MI Civic HSCE's:
3.1.4 Identify the role of independent regulatory agencies in the federal bureaucracy (e.g., Federal Reserve Board, Food and Drug Administration, Federal Communications Commission). (See USHG 6.3.2)
3.1.7 Explain why the federal government is one of enumerated powers while state governments are those of reserved powers.
6.1.1 Identify and research various viewpoints on significant public policy issues.

Supplemental Material:

Ballad of Lydia Pinkham

Let us sing (let us sing) of Lydia Pinkham
The benefactress of the human race.
She invented a vegetable compound,
And now all papers print her face,

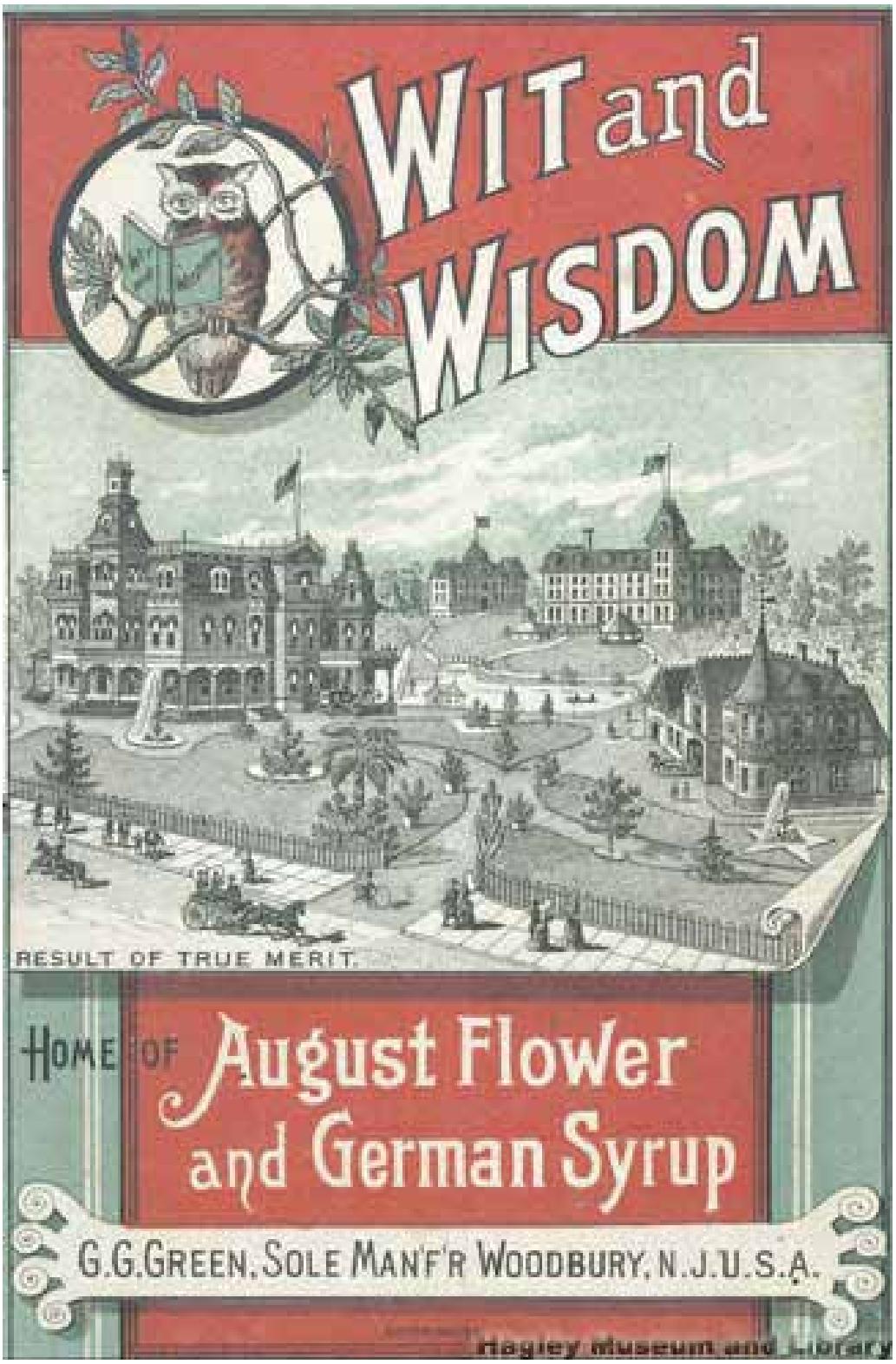
O, Mrs. Brown could do no housework,
O, Mrs. Brown could do no housework,
She took three bottles of Lydia's conpound,
And now there's nothing she will shirk,
she will shirk,

Mrs. Jones she had no children,
And she loved them very dear.
So she took three bottles of Pinkham's
Now she has twins every year.

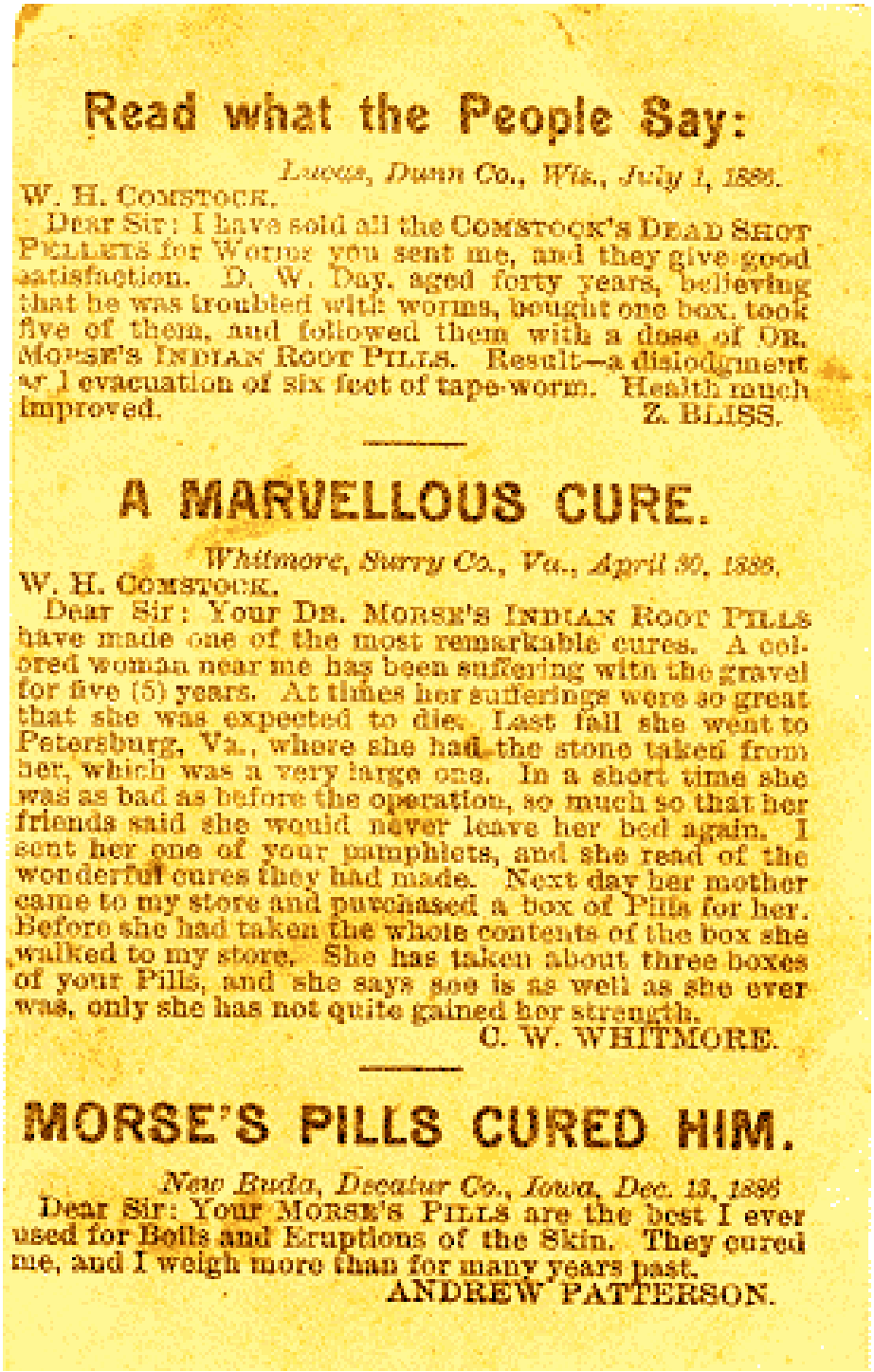
Lottie Smyth ne'er had a lover,
Blotchy pimples caused her plight;
But she took nine bottles of Pinkham's–
Sweethearts swarm about her each night.

Oh Mrs. Murphy (Oh Mrs. Murphy)
Was perturbed because she couldn't seem to pee
Till she took some of Lydia's compound
And now they run a pipeline to the sea!

http://sniff.numachi.com/~rickheit/dtrad/pages/tiLYDIAPNK;ttLYDIAPNK.html


WIT and WISDOM
RESULT OF TRUE MERIT.
HOME OF August Flower and German Syrup
G.G.GREEN, SOLE MAN'F'R WOODBURY, N.J.U.S.A.
Hagley Museum and Library


A tom-cat sat on a back yard fence,
With an aching heart and a soul intense,
Rigged out in a style in every sense,
Immense!
He was musing upon his lonely lot,
And said to himself, "She cometh not"!
What a terrible heart-ache I have got,
Great Scott!
Dr. Morse's Indian Root Pills.
The Best Family Pill in use.
FOR SALE EVERYWHERE.



Read what the People Say:

Lucas, Dunn Co., Wis., July 1, 1886.

W. H. COMSTOCK.

Dear Sir: I have sold all the COMSTOCK'S DEAD SHOT PELLETS for Worms you sent me, and they give good satisfaction. D. W. Day, aged forty years, believing that he was troubled with worms, bought one box, took five of them, and followed them with a dose of DR. MORSE'S INDIAN ROOT PILLS. Result—a dislodgment and evacuation of six feet of tape-worm. Health much improved.

Z. BLISS.

A MARVELLOUS CURE.

Whitmore, Surry Co., Va., April 30, 1886.

W. H. COMSTOCK.

Dear Sir: Your DR. MORSE'S INDIAN ROOT PILLS have made one of the most remarkable cures. A colored woman near me has been suffering with the gravel for five (5) years. At times her sufferings were so great that she was expected to die. Last fall she went to Petersburg, Va., where she had the stone taken from her, which was a very large one. In a short time she was as bad as before the operation, so much so that her friends said she would never leave her bed again. I sent her one of your pamphlets, and she read of the wonderful cures they had made. Next day her mother came to my store and purchased a box of Pills for her. Before she had taken the whole contents of the box she walked to my store. She has taken about three boxes of your Pills, and she says she is as well as she ever was, only she has not quite gained her strength.

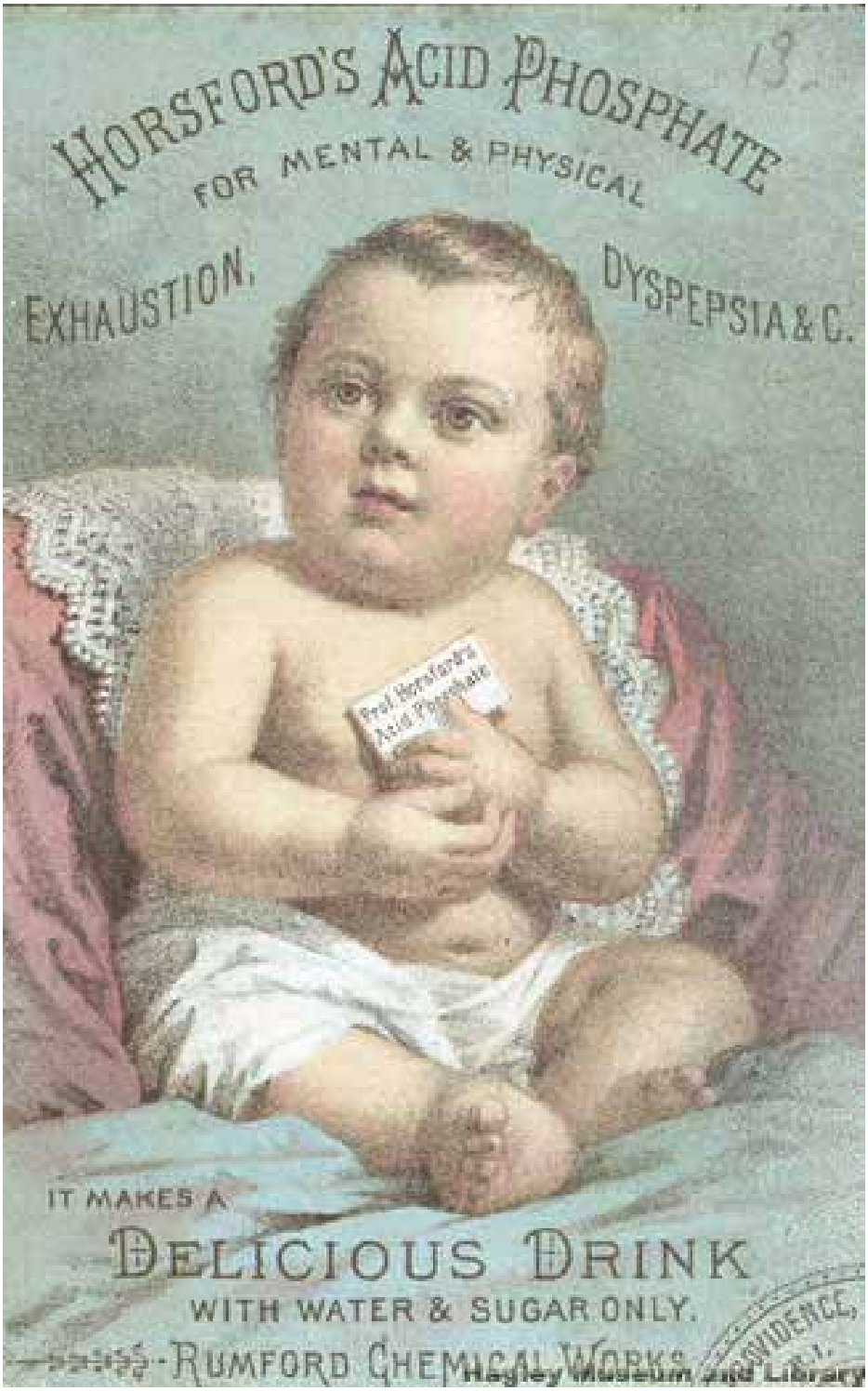
C. W. WHITMORE.

MORSE'S PILLS CURED HIM.

New Buda, Decatur Co., Iowa, Dec. 13, 1886

Dear Sir: Your MORSE'S PILLS are the best I ever used for Boils and Eruptions of the Skin. They cured me, and I weigh more than for many years past.

ANDREW PATTERSON.


HORSFORD'S ACID PHOSPHATE
FOR MENTAL & PHYSICAL
EXHAUSTION,
DYSPEPSIA & C.
IT MAKES A
DELICIOUS DRINK
WITH WATER & SUGAR ONLY.
RUMFORD CHEMICAL WORKS
PROVIDENCE, R. I.
Hagley Museum and Library


AYER'S
Sarsaparilla
The Best
Blood Purifier.
For HEALTH and LONG LIFE
USE
AYER'S SARSAPARILLA,
Prepared by Dr J.C. Ayer & Co. Lowell, Mass, U.S.A
OVER.

Ayer's Sarsaparilla

is a skilfully prepared extract of the finest Honduras sarsaparilla and blood-cleansing roots, such as stillingia and yellow dock, combined with the iodide of potassium. Each of its ingredients is in itself a superb alterative, universally recommended by the medical faculty. Combined, they make a blood-purifier of the highest power and efficacy. These facts have caused this preparation to be adopted by the medical and pharmaceutical professions as the standard Sarsaparilla, and furnish the reasons why it has earned the hearty gratitude of millions who have used it and bear witness to its excellence.

If you telephone for the doctor and find that he is out of town, just ask your druggist to send you a bottle of Ayer's Sarsaparilla. Those *tired feelings* are frequently the result of an impure, impoverished, or scrofulous condition of the blood, which weakens the digestive and assimilative organs, and renders them incapable of performing their functions. Thus, **Dyspepsia** is frequently due to a depraved condition of the blood, which also causes **Liver and Kidney Diseases, Jaundice, Dropsy,** and other serious disorders. In all such cases, the best remedy that can be used is AYER'S SARSAPARILLA.

PREPARED BY

Dr. J. C. AYER & CO., Lowell, Mass., U. S. A.

FOR SALE BY

The Name that Launched a Million Bottles

One of the most interesting patent medicines–one that is still on the market–is Lydia E. Pinkham's Vegetable Compound.

First marketed in 1875, the "female complaint" nostrum was widely advertised in the backs of newspapers and women's magazines. The ads often played on themes of the pain and suffering of being a woman, and featured glowing testimonials from women who claimed to have been healed from all manner of dysfunction and disease by the compound.

Such testimonials were encouraged by ad copy such as "Any woman... is responsible for her own suffering who will not take the trouble to write to Mrs. Pinkham for advice." The fact that Lydia Pinkham had died in 1883 didn't deter the company from continuing to play on her name and image.

The "write to Mrs. Pinkham" ruse was first given wide public exposure in 1905 when the muckraking *Ladies' Home Journal* published a photograph of Lydia Pinkham's tombstone, and speculated on the quality of medical advice being dispensed by a woman who had been dead for 22 years.

The red-faced company asserted that it hadn't meant to imply that *Lydia* Pinkham could be written to–it was her daughter-in-law, *Jennie* Pinkham, who answered the letters.

This explanation was soon exposed as a lie by journalist Samuel Hopkins Adams, who reported in *Collier's Weekly* that the Pinkham company employed a battery of typists who answered women's health inquiries with form letters, which usually encouraged the use of more of the Vegetable Compound.

The next year saw the passage of the Pure Food and Drug Act, which among other things, forced makers of patent medicines to disclose on the label the nostrum's alcohol content.

For the first time, users of the compound–many of whom were adamant non-drinkers, and some of whom were WCTU members–discovered that the Pinkham's was 15 percent alcohol. In fact, just before labeling was required, the formula had been changed; The old, undisclosed formula was even higher octane–closer to 20 percent alcohol.

The new law also forced manufacturers to scale back the claim for cures on the labels. No longer would purchasers of the compound be treated to claims such as: "A sure cure for PROLAPSUS UTERI, or falling of the womb and all FEMALE WEAKNESSES including leucorrhoea, irregular and painful menstruation, inflammation and ulceration of the womb, flooding,...for all weaknesses of the generative organs of either sex, it is second to no remedy that has ever been before the public, and for all diseases of the kidneys it is the GREATEST REMEDY IN THE WORLD."

The family-owned business sold out to Cooper Laboratories in 1968; pills and a liquid bearing the name of Lydia Pinkham are still for sale, albeit at a dwindling number of drug stores.

Lydia E. Pinkham and her Great Granddaughter, Health Hints, No. 136, 1926, Advertising records: Pinkham pamphlets, Schlesinger Library, Radcliffe Institute.

Born in 1818 in Lynn, Massachusetts, Lydia Estes was one of the most successful American businesswomen of the 19th century. As a young woman, she worked as a midwife, nurse, and schoolteacher and also became involved in the Female Anti-Slavery Society, the temperance movement, and the pseudoscience phrenology, which made character deductions about a person based on bone irregularities in the skull. In 1843, she married Isaac Pinkham, a wealthy real estate mogul.

In 1873, Pinkham founded the Lydia E. Pinkham Medicine Company in order to market an herbal medicine, Lydia E. Pinkham's Vegetable Compound, that she had developed to treat the medical problems of her female friends and family members. Comprised of black cohosh, life root, unicorn root, pleurisy root, fenugreek seed, and a substantial amount of alcohol, Pinkham's Vegetable Compound claimed to bring relief to women during the menstrual cycle by alleviating menstrual cramps, and also during menopause by counteracting depression, hot flashes, and other symptoms. The timing of Pinkham's business venture could not have been better, for in 1875 Isaac Pinkham's real-estate fortune plunged due to the onset of an economic depression in 1873.

The Lydia Pinkham Company was immensely successful. By the time of Pinkham's death in 1883, her famous Vegetable Compound was grossing $300,000 annually, and in 1925 annual profits peaked at $3.8 million. The success of the Vegetable Compound was due to Pinkham's wise decision to protect her herbal remedy by filing a patent with the US Patent Office in 1876, which ensured Pinkham family control over the herbal remedy for the next 50 years.

Even more important to the company's success were Pinkham's savvy marketing skills. In order to market her product directly to women, she placed her own face on the label to persuade women consumers that she understood personally the maladies from which they suffered, and thus could help them with her Vegetable Compound. In addition, the company published letters from customers endorsing the medicine in the "Pinkham Pamphlets."

The Pinkham Pamphlets published Lydia Pinkham's "answers" to women's medical queries, which in reality were staff-written responses that continued for decades after Pinkham's death. Nevertheless, the Pinkham Pamphlets were a means for distributing important medical advice about menstruation to women in an era when the standard treatment for vaginal cramps was the removal of the ovaries—a dangerous procedure in the 19th century with a mortality rate of 40 percent—as well as a reflection of 19th-century women's desires to take care of their own health, rather than leaving it in the hands of male medical practitioners.

Although her company had humble origins in her own kitchen, by the time the FDA restrained the company's activities in the early 20th century (the Pure Food and Drug Act of 1906 forced the company to reveal that the compound contained up to 20% alcohol), the Lydia E. Pinkham Medicine Company was a true multi-national corporation with production centers in Canada, Mexico, and the United States. "Lydia Pinkham Herbal Compound" is still available for sale in pill and liquid form. In the process, Lydia Pinkham changed the lives of thousands of American women by drawing attention to serious female medical issues that were being neglected by mainstream medicine.

Supplemental Food and Drug Act

Before 1906 people could sell whatever they wanted to, call it whatever they wanted to and claim that it could cure anything.

In 1906 the FDA passed the Pure Food and Drug Act, which required all medications to have correct labeling of all of its contents. This however did not mean that it had to work! You could still sell snake venom and tell people it cured arthritis as long as you labeled exactly what it was.

In 1938 the Federal Food, Drug and Cosmetics Act was brought on by the Elixir Sulfanilamide tragedy. Sulfanilamide is antibiotic that came in pill form, however they couldn't get children to take the pill so they decided to dissolve it into a liquid form using a solvent: diethyl glycol known to us as coolant, also used in brake fluid and other very hazardous and very poisonous products. It was chosen for the sweet taste, to get kids to like it. They also added a raspberry flavor to it. There were 107 deaths caused by the drug most of which were children.

This tragedy brought on the Federal Food, Drug and Cosmetics Act, which set standards for drug Safety. You now have to prove the drug's safety by the use of animal testing and clinical trials before it can be put on the market.

Then in 1962 there was the Thalidomide tragedy. Thalidomide was found to be a remedy for morning sickness in pregnant women; however it also caused horrifically severe birth defects in the fetus causing deformities of the arms and legs, causing what it is referred to as "flipper babies" because their limbs were just stubs or extra appendages.

This brought on the Kefauver-Harris Amendments of 1962, which required that drugs now not only had to be proven they were safe before they could be put on the market but that they were also effective. They had to do what they claimed to do and the benefit of the drug had to outweigh the potential risk.