



Henry Ford Museum\* ■ Greenfield Village\* ■ IMAX\* Theatre ■ Ford Rouge Factory Tour\* ■ Benson Ford Research Center\*

The story of **America's Industrial Revolution** is an epic tale, full of heroes and heroines, villains and vagabonds, accomplishments and failures, sweated toil and elegant mechanisms, grand visions and unintended consequences. How did the United States evolve from a group of 18<sup>th</sup> century agricultural colonies clustered along the eastern seaboard into the world's greatest industrial power? Why did this nation become the seedbed of so many important 19<sup>th</sup> century inventions and the birthplace of assembly-line mass production in the early 20<sup>th</sup> century? Who contributed? Who benefited? Who was left behind?

At The Henry Ford in Dearborn, Michigan, school teachers from across the country explored this story with university scholars and museum curators during two week-long teacher workshops supported by the National Endowment for the Humanities.

Workshop participants spent mornings discussing their passion for American history with distinguished university professors, mid-days on field trips to more than a dozen historic farms, mills and laboratories, and afternoons planning activities for their students. They developed methods for incorporating various senses and learning styles into new lesson plans that bring **America's Industrial Revolution** out of the books and into living history. This booklet contains samples of those lesson plans.

In Education,

A handwritten signature in black ink that reads "Gangopadhyay". The signature is written in a cursive style with a small flourish at the end.

Paula Gangopadhyay  
Director of Education, The Henry Ford  
Project Director, NEH Teacher Workshop

#### 2009 NEH Project Staff

Paula Gangopadhyay	Director of Education
Dorothy Ebersole	Curator of Education
Ryan Spencer	Education Coordinator- Special Projects
Marc Greuther	Chief Curator
Bob Casey	Curator of Transportation

## 2009 Participants for *America's Industrial Revolution* at The Henry Ford

June Workshop Participants



*"One of the most rewarding professional development activities imaginable. I cannot thank you enough for all of your organizational trouble. Your work is influencing more lives than you know."*

July Workshop Participants



*"I just loved the workshop and hate to see it end! It gave me a better understanding of the Industrial Revolution and the people that played the major roles in it."*

*"Everyone/thing was great. This is my first NEH workshop and I can't wait to do another! This was a wonderful first experience!"*

Middle School Lesson Plans provided by the 2009 *America's Industrial Revolution* at The Henry Ford Participants

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## Middle School Lesson Plan 1

Arlene Badger, Apex Middle School, Apex, NC

**Lesson Plan Title:** The Industrial Revolution: Marketing an Invention/Innovation

**Grade Level:** 8<sup>th</sup> Grade

**Overview:** This project is a major part of a unit on the Industrial Revolution and takes 8-9 days to complete. The project focuses on inventions/innovations of the Industrial Revolution and contains four parts, any of which could stand alone if there are time constraints. Students not only learn about the many inventions but also discover how to communicate ideas, work within group dynamics, and use primary sources.

**Central Question:** What were some of the inventions/innovations of the Industrial Revolution that changed the everyday lives of Americans?

**Objectives:** By the end of the project students will:

1. increase knowledge of the many inventions/innovations of the Industrial Revolution
2. understand the impact of the Industrial Revolution on American Society
3. gain experience using primary resources

**Evidences/Sources:** Students will use computers to access websites and primary documents to complete the project.

**Assessment:** By using the different planning sheets, the teacher will be able to monitor a group's progress throughout the entire process. After the presentation is completed, groups will turn in all work to the teacher for an overall grade. Students will also be asked to fill out a group participation sheet and assign a grade to group members. Finally, students will write a reflection about their experience.

**Instructional Sequence:** **Before Day 1:** Discuss in brief the upcoming project and have students choose groups. A group of four students works best.

**Day 1 (Friday):** Introduce the project, discuss the project requirements in depth, assign a due date, and have each group choose an invention/innovation. Then have the groups complete the Project Plan Sheet. (Each student needs one of these to keep track of his/her assigned roles.) Each group will be given the rest of planning sheets (one per group) for the project. Each day will focus on a certain project requirement but students may work on any part of the project at any given time.

**Days 2&3 (Mon. /Tues.):** Students will be in the Computer Lab researching their topics, gathering information, printing out written text and pictures, and conferring with the teacher about any questions that come up.

**Day 4 (Wed):** Students are back in the classroom and may return to the Computer Lab as needed. Today the focus will be on planning the poster. Using the Planning the Poster worksheet, each group will plan the poster format for their invention.

**Day 5 (Thurs.):** Students will plan the design of their brochure by using their own notebook paper and folding it into thirds.

**Day 6 (Fri.):** Today's focus is on planning, writing, and running through the 30 second commercial. Homework is for each group member to put the final touches on their part of the project.

**Day 7 (Mon.):** The final touches are made to the project. Students will work on their presentations and groups will be called out to film commercials.

**Days 8&9 (Tues. /Wed):** Use both days if needed for project presentations. For homework, have each student write a one page reflection about what they have learned not only about their invention but others as well. Then students are to predict what they think the impact will be of the Industrial Revolution on America.

## Industrial Revolution Project: Marketing an Invention/Innovation

Congratulations! Your group has just been hired by an inventor to help him bring his new invention/innovation to market. Your job has two parts. First, you need to become an expert on the invention/innovation-find out how it works, what it's for, and how it's made. Second, you need to figure out how to help your client turn his idea into a profit making business. For that you must identify potential buyers and would-be investors. Below is a list of inventions/innovations. Your group should choose one. Once an invention/innovation has been selected, it will no longer be available.

### Inventions/Innovations:

Model T	Steam Locomotive	Band-Aids
Assembly Line	Refrigerator	Electric Fan
Incandescent Light Bulb	Dishwasher	Contact Lenses
Telephone	Gas Mask	Traffic Lights
Zeppelin	Short Wave Radio	Nylon
Power Loom	Helicopter	Toilet Paper
Tin Foil Phonograph	Insulin	Windshield Wipers
Sewing Machine	Lie Detector	Blue Jeans
Neon Lights	Metal Detector	Crayons
Airplane	Carpet Sweeper	Drinking Straws
Glider	Zippers	Air Conditioner
Combine	Kinetoscope	Roller Skates
Tractor	Kinetograph	Ferris Wheel
Typewriter	Kinetophone	Roller Coaster
Washing Machine	Kleenex	Mechanical Cash
Escalator	Burglar Alarm	Register
Steamboat	Wireless Telegraph	Safety Razor
Bicycle	Microwave Oven	

### Project Requirements:

**Poster (50 Points)** - The poster needs to have a slogan, pictures, important information about the invention, and who invented it. Remember, you are trying to sell this invention. Make your poster bright, fun, and attractive so that potential buyers and investors will buy into your product.

**Brochure (50 Points)** - The brochure needs to include the same things as the poster only on a much smaller scale. Remember, brochures are usually folded so keep this in mind as you decide the size of pictures you add and the placement of your information.

**Commercial (50 Points)** – Your group will be filming a 30 second ad (just like a TV commercial). The commercial will air at the end of your presentation. You may use your poster or brochure in the commercial.

**Presentation (50 Points)** - During your presentation, you must speak to your audience, be persuasive, provide good information, know what you are selling, answer all questions asked, and work as a team.

**Total Project Points (200 Points)**

# Industrial Revolution Project Plan Sheet

**Group Members:**

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**Group Invention/Innovation:** \_\_\_\_\_

Now that you have selected an invention/innovation, use the space below to brainstorm a list of ideas/topics your group wants to research about your invention.

This project is a group effort. Since our time in the computer lab is limited, it is very important that you have specific roles planned out for each group member. Using the list above and the different requirements for the project, plan out the specific

Example:

Johnny

Research inventor, work on poster,  
print pictures of invention

**Group Member's Name**

**Specific Role**

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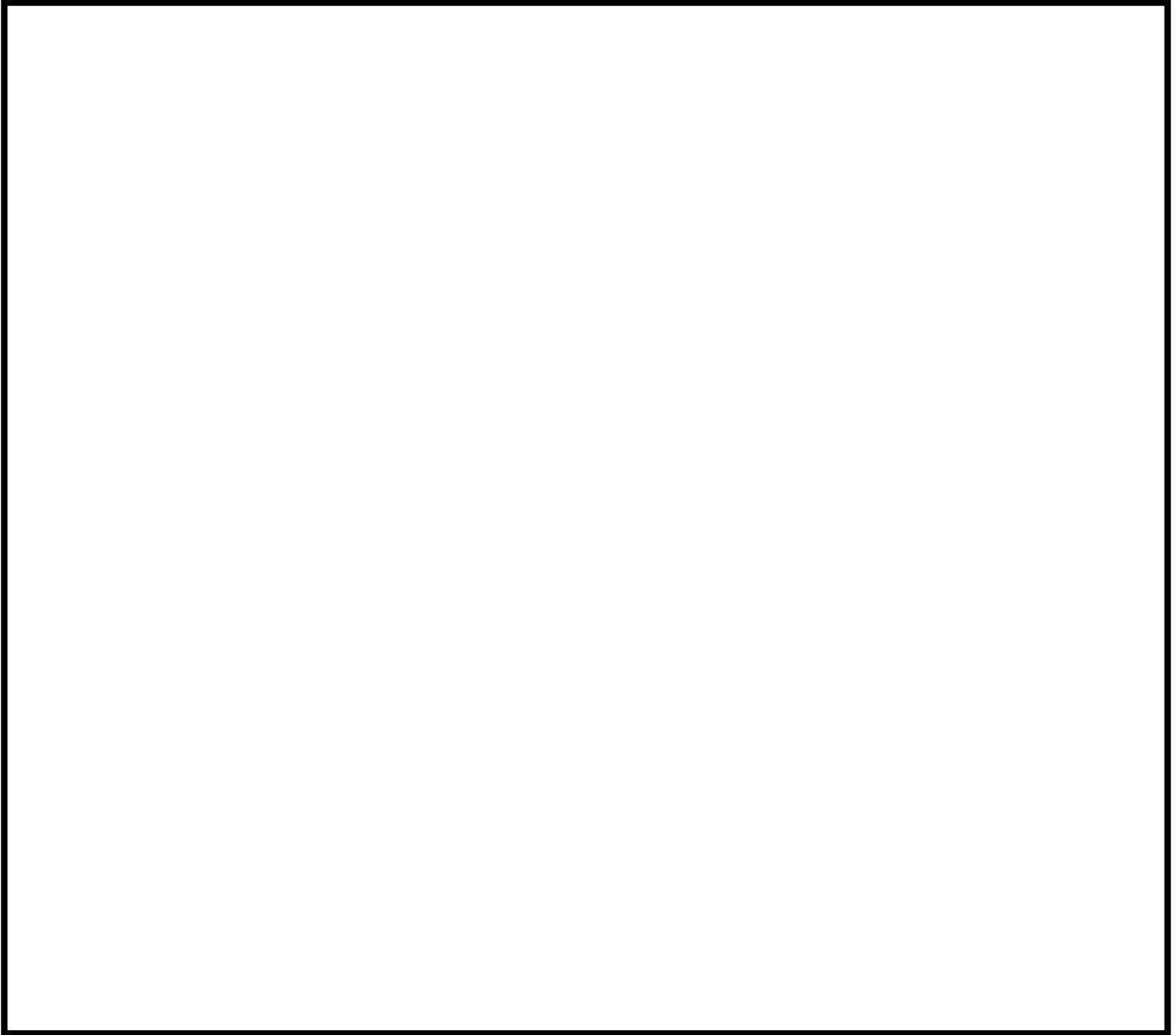
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## Planning the Poster

Using this sheet as a guide, sketch out your poster. Consider the required parts, the pictures, and the information you have printed when planning. This sheet will be turned in as evidence of your group's work and planning skills – take it seriously! When you have finished sketching, begin working on your actual poster!



**Group Members:**

## Planning the Brochure

Use a piece of your own notebook paper and turn it sideways. You are going to fold it into thirds by folding first the right side over and then the left. Now decide where you will place the information on the brochure. Remember, you need to include your advertising slogan, pictures, important information, and color. The notebook paper used to plan the brochure will be turned in as evidence of your group's work and planning skills – take it seriously! When you have finished sketching, begin working on your actual brochure. You may either draw/write the brochure by hand or create one on the computer.

## Planning the Presentation

The presentation to prospective buyers and investors (your classmates) should be 5-7 minutes long. At the end of the presentation, your recorded commercial will be played. All members should take part. Remember, you are trying to convince people to buy or invest in the product. Be persuasive and provide good information. Be prepared to answer questions from your audience. Any notes you use will be turned in as proof of your group's work and planning skills. There will be class time provided to run through your presentations.

## Planning a Commercial

**Congratulations, you have almost completed your Invention Project. The last product that you will create is a 30 second commercial in which you try to persuade buyers to invest in your product. Before you begin filming your commercial, it is important that you have a plan. Using this sheet, plan your commercial!**

<b>Name</b>	<b>Role in Commercial (actor, director, writer, etc.)</b>

- 1. Brainstorm** – Using what you have learned during your research, list possible ideas for creating your commercial. Use this space to brainstorm information that you want to use, possible props, costumes, etc.
- 2. Narrow Down** – Using the ideas that you just listed, narrow down your list to items you definitely want to include.
- 3. Plan the Script** – Now that you have all ideas in place, decide who is going to write the script, act, dance, etc. You may choose to make your commercial a “news update” or just a fun commercial. PLEASE NOTE: *Everyone* must have a role. Use this space to come up with a script for you commercial. It is important that you list peoples’ names and their specific task/line in the commercial.
- 4. Approval** – After all of these steps are complete, bring your plan sheet to a teacher for approval!

## Industrial Revolution Project Rubric

\*Please bring your copy of the rubric on the day of your groups' presentation.\*

Group Members: \_\_\_\_\_  
 \_\_\_\_\_ Core \_\_\_\_\_

<p><b><u>Poster</u></b></p> <p style="text-align: center;">Slogan 10</p> <p style="text-align: center;">Pictures 10</p> <p style="text-align: center;">Color/Creativity 10</p> <p style="text-align: center;">Information 20</p>	<p>_____ / 50</p>
<p><b><u>Brochure</u></b></p> <p style="text-align: center;">Slogan 10</p> <p style="text-align: center;">Pictures 10</p> <p style="text-align: center;">Color/Creativity 10</p> <p style="text-align: center;">Information 20</p>	<p>_____ / 50</p>
<p><b><u>Presentation</u></b></p> <p style="text-align: center;">Worked as a team 15</p> <p style="text-align: center;">Persuasive 10</p> <p style="text-align: center;">Good information about product 25</p>	<p>_____ / 50</p>
<p><b><u>Commercial</u></b></p> <p style="text-align: center;">Worked as a team 10</p> <p style="text-align: center;">Persuasive 15</p> <p style="text-align: center;">Sold Product 15</p> <p style="text-align: center;">Creativity 10</p>	<p>_____ / 50</p>
<p><b>Total Points</b></p>	<p>_____ / 200</p>

Group Participation – please write the names of your group members (including yourself) and the participation grade –out of 100- you believe each person deserves.

Name:

Grade:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

## Industrial Revolution Project Checklist

**After your presentation, place each item in the following order, staple together, and turn into your teacher.**

- Inventions Project Rubric(one from each member)
- Industrial Revolution Project Plan Sheet(turn in just one)
- Poster Planning Sheet
- Brochure Planning Sheet(piece of notebook paper)
- Brochure
- Commercial Planning Sheet
- Any notes for Presentation
  
- **Turn in your poster separately from the rest of the project.**
- ion Project Plan Sheet(turn in just one)
- Poster Planning Sheet
- Brochure Planning Sheet(piece of notebook paper)
- Brochure
- Commercial Planning Sheet
- Any notes for Presentation
  
- **Turn in your poster separately from the rest of the project.**

## **Industrial Revolution Project Reflection**

You are to write a one page reflection about what you learned by participating in this project. Discuss not only what you discovered about your invention but the others you heard presented as well. Also, talk about your research. Was it easy or hard to find information? Where primary sources easily available? Finally, consider what you have learned and predict what they think the impact will be of the Industrial Revolution on America.

The reflection needs to be one page long and may be written or typed. It should contain an introductory sentence, your thoughts on the project, and a concluding sentence. Please check for spelling and grammar



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## Middle School Lesson Plan 2

Janet Flichtbeil, Aloha-Huber Park, Beaverton, OR

- Lesson Plan Title:** Introduction to America's Industrial Revolution
- Grade Level:** 5-8
- Time Frame:** 50-60 minutes
- Overview:** This lesson engages the students in brainstorming activating their minds to some of the changes that occurred in various aspects of American life as a result of some technological improvements from the time known as the Industrial Revolution. The ensuing unit will delve into the effects of innovation and invention on economy, urbanization, immigration, and political reforms of the late 19<sup>th</sup> Century and early 20<sup>th</sup> Century. The activity is open-ended, allowing for discourse at basic as well as sophisticated levels.
- Central Question:** How did new inventions and innovations affect life in America?
- Curriculum Links:**
- National History Standards:**
- 4.2.A: Explain how the major technological developments that revolutionized land and water transportation arose and analyze how they transformed the economy, created international markets, and affected the environment.
  - 4.2.B: Analyze how rapid urbanization, immigration, and industrialization affected the social fabric of racial hostility.
  - 4.2.C: Assess the connection between industrialization and immigration.
  - 6.1.A: The student understands the connections among industrialization, the advent of the modern corporation, and material well-being.
  - 6.3.B: Analyze the causes and effects of escalating labor conflict.
- Oregon/Beaverton School District Standards and Curriculum Guidelines (Grade 8)**
- Explain how technological, transportation, and communication innovations transformed the American economy in the late 19<sup>th</sup> Century.



Explain how business leaders sought to limit competition and maximize profits in the late 19<sup>th</sup> Century.

Analyze how political machines gained power and were viewed by immigrants, middle-class reformers, and political bosses.

Understand the effect of European immigration after 1870 and rural to urban migration.

**Objectives:**

The student will:

- compare pictures of innovations, explaining differences
- determine the purpose of the innovation and who will make use of the object
- explore changes to American life as a result of each innovation: economic changes, social changes, political changes, etc.

**Remediation:**

Teacher will

- place students in heterogeneous groups or with appropriate partners
- allow students to use home language
- allow students to give personal examples for explanations

**Enrichment:**

Teacher will

- expect higher-order thinking
- prompt students to infer and connect

**Resources:**

Placards (13 follow the lesson plan) with pictures of early item and innovation

**Lesson Procedure:**

Discuss technological changes in the present day, reasons for the change, and effects of the change on life today: social, economic, and political effects.

Introduce the era known as the Industrial Revolution.  
Demonstrate the shared Placard activity:

- Have students take notes (notebook paper or cards) as follows:

Placard \_\_\_\_  
 Describe in detail  
 Picture 1

Describe in detail  
 Picture 2

Social Changes	Economic Changes	Political Changes
----------------	------------------	-------------------

- Have students work in small groups or partners, sharing Placards. They may write up the Placards in any order.
- Allow about 45 minutes for Placard activity

Explain the summative independent activity: writing a short essay summarizing the social, economic, and political effects of changes during the Industrial Revolution. Provide the Proficiency Guidelines and Scoring Elements for this essay. This essay could be completed in class or for homework.

**Assessments:** Formative: during group and class discussion, both oral and written responses

Summative: student essay, summarizing probable effects of innovations during America’s Industrial Revolution on the life of people.

**Proficiency Guidelines:**

Novice (N); Working Toward Proficiency (WP); Nearly Proficient (NP); Proficient (P); Highly Proficient (HP)

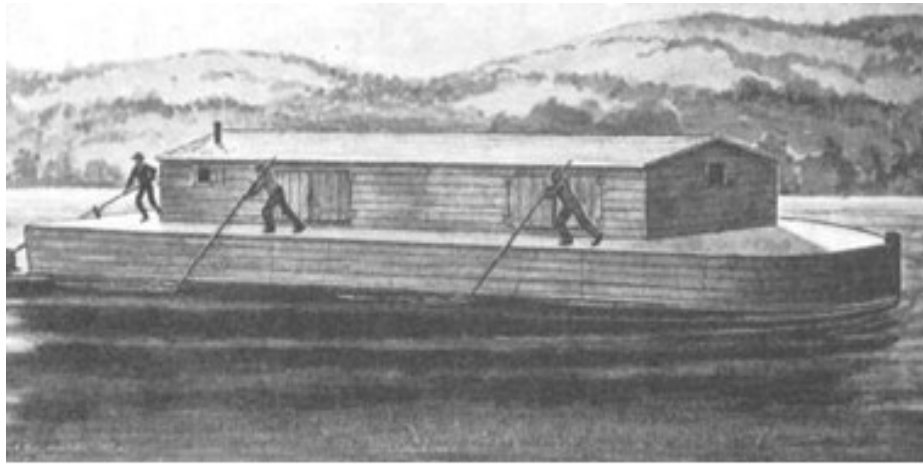
Scoring Elements: Introduction: Industrial Revolution N, WP, NP, P, HP

Economic effects N, WP, NP, P, HP

Social effects N, WP, NP, P, HP

Political effects N, WP, NP, P, HP

## PLACARD A



**Picture 1**



**Picture 2**

## PLACARD B



**Picture 1**



**Picture 2**

## PLACARD C



Picture 1



Picture 2

## PLACARD D



**Picture 1**



**Picture 2**

## PLACARD E



**Picture 1**

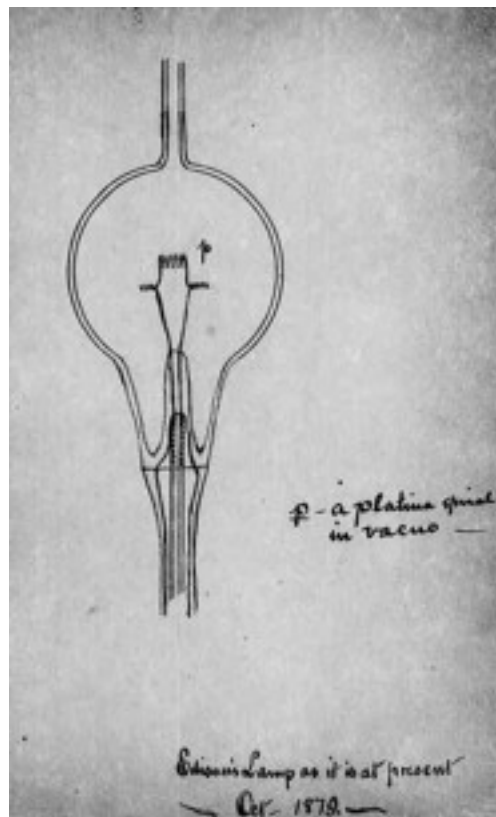


**Picture 2**

## PLACARD F



Picture 1



Picture 2





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### Middle School Lesson Plan 3

Aimee Saddler, Tualatin Valley Junior Academy, Hillsboro, OR

- Lesson Plan Title:** Sights and Sounds
- Grade Level:** Grade 8
- Overview:** This lesson will attempt to show students the connections between the modern car and the Model T. Students will participate in a series of activities that ask them to evaluate the "Sights and Sounds" of the modern automobile and then compare them with the Model T.
- Central Question:** How are the Model T and the modern automobile connected?
- Learning Objectives:** Students will be able to:
- Identify similarities and differences between the Model T and modern automobiles
  - Discuss the role of the Model T in early 20<sup>th</sup> Century America
  - Use specific examples to describe the connection between the Model T and modern automobiles
- Assessment Tools:** Students will be observed while participating in each of the lesson activities. Students will also be asked to respond in writing to the lesson's Central Question. (This lesson will be only a portion of a larger unit on the Industrial Revolution which will include a cumulative assessment piece).
- Sources:** For some of the activities students will need access to the Internet either in the classroom or at home. The remainder of the activities can be completed using the handouts given.
- Activity 1: Modern "Sights and Sounds" worksheet, to be completed as initial homework assignment
- Activity 2: Model T photo scavenger activities, in class using pictures from the Benson Ford Research Center

Activity 3: Model T “Sights and Sounds”, to be completed as homework, requires Internet access

Activity 4: Henry Ford Museum Vehicle Inventory Activity, in class and will require Internet access

**Duration:** Two 90-minute block periods for this lesson (only part of a unit on the Industrial Revolution)

- Instructional Sequence:**
1. Students will be given the Worksheet titled “Sights & Sounds” and asked to complete it for homework.
  2. Beginning of first block period, the “Sights and Sounds” worksheet will be used to facilitate a discussion of the way we use the modern automobile as well as the sights and sounds associated with cars in general.
  3. This class discussion will lead us into an introduction to the exterior of the Model T. We will use photographs from the Benson Ford Research Center to complete the following activities.
    - a. In groups students will be given a set of photographs and asked to categorize them in anyway they wish. Each group will then share with the rest of the class.
    - b. Also in groups students will be asked to caption each of their photographs and share their best/favorite caption with the class (possibly post these on a bulletin board).
    - c. Individually, students will each take a photo and write down everything in the photo that is different then in a modern car. (They may wish to refer back to their completed “Sights and Sounds” homework paper).
  4. To conclude this first block period we will discuss the differences that students saw from part 3c above. This will lead into their homework assignment which will be to complete the “Model T: Sights & Sounds” worksheet (Internet required)
  5. Beginning the second block period we will discuss the videos that students watched for homework and their answers on the “Model T: Sights & Sounds” worksheet.

6. During the remainder of the class period we will explore some of the Henry Ford Museum using the online exhibit “The Automobile in American Life”. This activity (Handout) will require Internet access for groups or individuals. At the conclusion of the class period (or assign as homework) students will be asked to respond in writing to the lesson’s guiding questions: How are the Model T and the modern automobile connected? Student responses should include specific examples and reference to activities completed as homework or in class.

## Sights & Sounds

Driving in a car is a transportation experience unlike any other---and with that experience comes, sounds, sights, smells, and experiences unlike any other! Cars have changed over time, and so has the world outside the car. Complete this form the next time you are a passenger in an automobile. **DO THIS ONLY WHEN YOU ARE A PASSENGER!**

### **I. Before you start driving...**

**Type of Car:**

**Date of Trip:**

**Color of the car exterior:**

**Color of the car interior:**

**Where are you sitting (front, back, etc)?**

**Weather:**

**Driver of Car:**

### **II: Now, ask the driver to start the car...**

#### **WHAT DID YOU...**

- 1. Hear when the car was started? (Turn down the radio!)**
  
- 2. Smell when the car was started?**
  
- 3. Feel when the car was started? (Physical sensations)**

**Listen to the car run for a moment.  
Write down everything you think of  
while you are listening.**

**III. During the drive...**

**How fast was the car going?**

**What do you see out the front window?**

**What types of roads are you traveling? (Side streets, freeways, etc.)**

**What do you see out the side windows?**

**How does the car feel when it's moving?**

**What sounds do you hear as the car is being driven?**

**Estimate how many cars are driving around you.**

**What kinds of businesses do you pass? How many of these businesses have drive-thru's?**

**How many gas stations did you see?**

**How many times did you stop at stop lights?**

### MODEL T: Sights and Sounds

Now that you have examined the sights and sounds of the modern automobile, let's take a look at the Model T.

The Model T is quite different from modern automobiles, in the way it starts and also in how it drives. Henry Ford Estate Fair Lane has a great video that demonstrates just how different the Model T is.

Go to <http://www.henryfordestate.org/teaching.htm> and select the Centennial Video "How to Drive a Model T"

Answer the following questions as you watch.

1. Where is the gas tank located?
2. When was the Model T shown in the video built?
3. How do the tires in the video compare to modern tires?
4. How is the engine speed controlled in the Model T?
5. What are the three pedals on the floor?

Now watch the following two videos. One will show a Model T engine starting and running. The other will show a modern engine starting and running. More than watching, I want you to listen to the vehicles. What sounds do they make? How are they alike? How are they different? Write your answers in the space below.

[http://www.youtube.com/watch?v=oA5Oq\\_ftkol&feature=related](http://www.youtube.com/watch?v=oA5Oq_ftkol&feature=related) (Model T)

<http://www.youtube.com/watch?v=hVcU-Gl-LzU&feature=Playlist&p=107EA3C76DF6845F&index=17> (07 Mercedes Benz)

**The Henry Ford Vehicle Inventory: Web quest!**

1. Go to the Henry Ford museum website (<http://www.thehenryford.org/museum>)
2. Go to the Online Exhibit: The Automobile in American Life (<http://www.thehenryford.org/museum/automobile.aspx>)
3. Look at each of the cars in the exhibit, and fill in as many details as possible on the chart below.

<b><u>VEHICLE</u></b>	<b><u>COLOR</u></b>	<b><u>INTERIOR/PASSENGER SPACE</u></b>	<b><u>OUTSIDE FEATURES</u></b>	<b><u>INSIDE FEATURES</u></b>	<b><u>HOW IS IT DIFFERENT FROM MODERN VEHICLES</u></b>
<b>15 Millionth Ford Model T Touring Car</b>					
<b>Tucker '48</b>					
<b>Ford 999 Racer</b>					
<b>Bugatti Royale Type 41 Convertible</b>					
<b>EV1</b>					
<b>Ford Mark IV Race Car</b>					
<b>Ford Mustang #1</b>					

<b>Old 16</b>					
<b>Vehicle of your choice:</b>					





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### Middle School Lesson Plan 4

Marlene Sullivan, Mountain Oak School, Prescott, AZ

<b>Lesson Plan Title:</b>	Thomas Edison and Henry Ford
<b>Grade Level:</b>	6-8 United States History
<b>Time Frame:</b>	55 minutes
<b>Objectives:</b>	Students will: Identify the contributions of Thomas Edison and Henry Ford to the changing social and political structure of the United States.
<b>Materials:</b>	List of major or significant inventions of Thomas Edison <a href="http://www.thomasedison.com/Inventions.htm">http://www.thomasedison.com/Inventions.htm</a> Article on Henry Ford's achievements <a href="http://fordlife.org/achievements.aspx">http://fordlife.org/achievements.aspx</a> T-Chart (one for each inventor)
<b>Learning Strategies:</b>	Triad and whole class grouping, graphic organizer
<b>Procedures:</b>	Teacher reviews life in the U.S. at the end of the Civil War (10 min.)  Group students, hand out documents and T-Chart (one set to each group)  Students will read and discuss documents (10 min.)  Using each inventor's T-chart, groups will record inventions that affected a social or political change (15 min.)  While still in groups, a whole class sharing of T-charts occurs (10 min.)
<b>Assessment:</b>	Each student will select one innovation from their groups T-chart and provide a written reflection on how it affects their life today. (10 min.)

# Thomas Edison

Social

Political

# Henry Ford

Social

Political



America's Greatest History Attraction

## Middle School Lesson Plan 5

Jane Wilson, Waltham Elementary, Utica, IL

- Lesson Plan Title:** Industrial Revolution in Illinois
- Grade Level:** 6<sup>th</sup> Illinois History
- Time Frame:** 3-5 days
- Objectives:** Students will:  
Identify the contributions of Thomas Edison and Henry Ford to the changing social and political structure of the United States.
- Objectives:** The students will:
- Increase their knowledge of the Industrial Revolution
  - Research using various print and online resources
  - Focus on Industrial Revolution advancements as they occurred in Illinois
  - Work in groups to prepare a report or presentation
  - Present to the class
- Materials:** Illinois Adventure, classroom textbook
- <http://www.thehenryford.org/>
- <http://www.edison.rutgers.edu/>
- <http://www.hydepark.org/historicpres/ColumbianExp.htm>
- <http://www.illinoisaghistory.com/FarmEquipmentNW.htm>
- Other print and online sources
- Curriculum Links:** Illinois State Standards:
- 16.A.2c** Ask questions and seek answers by collecting and analyzing data from historic documents, images and other literary and non-literary sources.
- 16.A.3c** Identify the differences between historical fact and interpretation.

**16.C.2b (US)** Explain how individuals, including John Deere, Thomas Edison, Robert McCormack, George Washington Carver and Henry Ford, contributed to economic change through ideas, inventions and entrepreneurship.

**16.C.3b (US)** Explain relationships among the American economy and slavery, immigration, industrialization, labor and urbanization, 1700-present.

**16.C.2c (US)** Describe significant economic events including industrialization, immigration, the Great Depression, the shift to a service economy and the rise of technology that influenced history from the industrial development era to the present.

**Procedure:**

Preview prior knowledge of the Industrial Revolution and read the textbook on Inventors and innovators.

Depending on the size of the class, divide into 5 groups of 3-5 students. The five groups will be Steam Power, Electricity, Agriculture, Trains, and Water Transportation. Note: I would use a picture to represent each topic, cut it into the correct number of pieces and hand them out to the students randomly. They would find the correct matches to the pictures to form their groups.

Each group will research their Industrial Revolution topic and how this impacted Illinois History. Time will be given to do research in the library and computer lab.

Each group will research the inventors and the innovators connected to their topic.

Each group will decide how to present their information to the class. This could be done in a written report, PowerPoint presentation, or an oral presentation to the class.

Each group will have 15-20 minutes to present their information to the class.

**Assessment:**

The written report should be 3- 5 pages. The PowerPoint or the oral presentation should be 15-20 minutes in length.

Each presentation should represent the combined effort of the group.

Each presentation should include the inventions, the people, the locations and their impact on Illinois history.

Each teacher should use a rubric they are comfortable with to assess the work of their students.



America's Greatest History Attraction

## Middle School Lesson Plan 6

Michelle Dulaney, Howardsville Christian School, Marcellus, MI

<b>Lesson Plan Title:</b>	Ford's Assembly Line: Transportation Transformation
<b>Grade Level:</b>	7 <sup>th</sup>
<b>Time Frame:</b>	One class period
<b>Overview:</b>	This lesson discusses the development and dramatic impact of Henry Ford's assembly line on a progressing America.
<b>Central Question:</b>	What caused the transportation transformation?
<b>Learning Objectives:</b>	Students will... <ol style="list-style-type: none"><li>1. understand the history and steps of development of the assembly line.</li><li>2. understand the impact of standard, interchangeable parts and the assembly line on transportation.</li><li>3. understand how specialization and division of labor increase productivity.</li></ol>
<b>Assessment Tools:</b>	Student understanding will be assessed by a John Collins Type II writing assignment.
<b>Key Concept:</b>	Assembly line development
<b>Evidence/Sources:</b>	<p>Pictures from Bob Casey's NEH 2009 Lecture: "Winding the mainspring of the 20<sup>th</sup> century, The Development of the Assembly Line".</p> <p>Cross &amp; Szostak (1994) Ch.'s 14 and 15. <u>Technology and American Society</u>, p.220-222, Upper Saddle River: Prentice Hall, Inc.</p> <p>The Life of Henry Ford) <a href="http://www.thehenryford.org/exhibits/hf/default.asp">http://www.thehenryford.org/exhibits/hf/default.asp</a></p>

The Ford Rouge Complex: A Case Study In Industrialization-  
-Curriculum Connector

<http://www.thehenryford.org/rouge/eduResources/caseStudyIndustrialization.pdf>

**Instructional Sequence:** Fill in the blank lecture notes

Group/individual picture activity

Quiz-John Collins Type II

**Student Project Idea:** Picture activity included in sequence.

**Anticipated Challenges:** This lesson plan addresses the misconception that Henry Ford invented the fires car and the idea that the assembly line was an idea that happened successfully overnight!



Name: KEY

## Ford's Assembly Line:

# Transportation Transformation

**1863**-Henry Ford born on **farm** in **Dearborn**, MI

**1879**- Sixteen-year-old Henry Ford leaves Dearborn for **Detroit** to work as a **mechanic** apprentice

**1891**- Henry Ford, now married, becomes an engineer at the **Edison** Illuminating Company in **Detroit**.

**1893**- Henry Ford promoted to Chief **Engineer** and now has time and money to work on his personal interest, the **internal combustion** engine.

**1896**- Henry Ford builds his first **Quadricycle**.

\*Henry Ford was **not the first** to build a car, but he was one of the innovative automotive pioneers that would transform the country!

\*The Quadricycle had a **gasoline** engine, four bicycle-like wheels, steered with a boat like **tiller**, and only went **forward** in **2** speeds.



Henry Ford on the Quadricycle, 1905  
Photo: P.O. 490-thehenryford.org

**1903**- Henry Ford opens the **Ford Motor Company** on Mack Avenue in **Detroit** after two **failed** attempts.

\*Groups of **two** to **three** men assembled car **parts** that were produced by **other** companies.

**1908**- Henry Ford introduces the **Model T**.

\*Why is it called the **Model T**? The Ford models went through many changes beginning with the Model **N**. The Model **S** went through a major **overhaul** thus giving us the **Model T**.

\*Henry Ford wanted to produce a car that was **affordable, reliable, and efficient** and the Model T accomplished that! It was also fairly easy to **drive, take care of,** and could handle the rough **roads** of the day.



Henry Ford with his Model T (Photo P.O. 3015A)



Model T (Henry Ford Museum D31384)

(Photos from thehenryford.org)

**1913-** Ford engineers introduce a **moving assembly line** for auto production

\*Ford conducted **time and motion** studies to develop the best **method**, rate of speed of the **conveyer** belt, **height** of work stations, and worker **placements** for maximum **efficiency**.

\***Moving Assembly Line**(def)-Production method pioneered by Henry Ford in which parts are moved **to the worker** rather than the worker to the parts to produce an automobile.

\*Principles of the Ford assembly Line:

1-**Moving Assembly Line** (def)-Workers perform only one or a few of many steps in a production process.

2- **Interchangeable Parts**-Popularized in America by Eli Whitney, parts were standardized and therefore could be mass produced for ease of production. Interchangeable parts also meant parts would be easier to replace by the consumer.

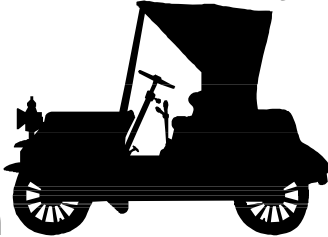
3-**Specialized machines** for each work station

4-Elimination of the many **workers** needed to bring parts to the assembler. Fewer workers resulted in a lower production cost. The lower cost of production made the Model T more affordable to middle class America.

**1918-** **Half** of all cars in America were **Model T's!**

Name: \_\_\_\_\_

## Ford's Assembly Line:



### Transportation      Transformation

**1863**-Henry Ford born on \_\_\_\_\_ in \_\_\_\_\_, MI

**1879**- Sixteen-year-old Henry Ford leaves Dearborn for \_\_\_\_\_ to work as a \_\_\_\_\_ apprentice

**1891**- Henry Ford, now married, becomes an engineer at the \_\_\_\_\_ Illuminating Company in \_\_\_\_\_.

**1893**- Henry Ford promoted to Chief \_\_\_\_\_ and now has time and money to work on his personal interest, the \_\_\_\_\_ engine.

**1896**- Henry Ford builds his first \_\_\_\_\_.

\*Henry Ford was \_\_\_\_\_ to build a car, but he was one of the innovative automotive pioneers that would transform the country!

\*The Quadricycle had a \_\_\_\_\_ engine, four bicycle-like wheels, steered with a boat like \_\_\_\_\_, and only went \_\_\_\_\_ in \_\_\_\_\_ speeds.



Henry Ford on the Quadricycle, 1905  
Photo: P.O. 490-thehenryford.org

**1903**- Henry Ford opens the \_\_\_\_\_ on Mack Avenue in \_\_\_\_\_ after two \_\_\_\_\_ attempts.

\*Groups of \_\_\_\_\_ to \_\_\_\_\_ men assembled car \_\_\_\_\_ that were produced by \_\_\_\_\_ companies.

**1908-** Henry Ford introduces the \_\_\_\_\_.

\*Why is it called the \_\_\_\_\_? The Ford models went through many changes beginning with the Model **N**. The Model **S** went through a major \_\_\_\_\_ thus giving us the \_\_\_\_\_.

\*Henry Ford wanted to produce a car that was \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ and the Model T accomplished that! It was also fairly easy to \_\_\_\_\_, take \_\_\_\_\_, and could handle the rough \_\_\_\_\_ of the day.



Henry Ford with his Model T (Photo P.O. 3015A)



Model T (Henry Ford Museum D31384)

(Photos from thehenryford.org)

**1913-** Ford engineers introduce a \_\_\_\_\_ for auto production

\*Ford conducted \_\_\_\_\_ studies to develop the best \_\_\_\_\_ of speed of the \_\_\_\_\_ belt, \_\_\_\_\_ of work stations, and worker \_\_\_\_\_ for maximum \_\_\_\_\_.

\* \_\_\_\_\_ (def)-Production method pioneered by Henry Ford in which parts are moved \_\_\_\_\_ rather than the worker to the parts to produce an automobile.

\*Principles of the Ford assembly Line:

1- \_\_\_\_\_ (def)-Workers perform only one or a few of many steps in a production process.

2- \_\_\_\_\_ -Popularized in America by Eli Whitney, parts were standardized and therefore could be mass produced for ease of production. Interchangeable parts also meant parts would be easier to replace by the consumer.

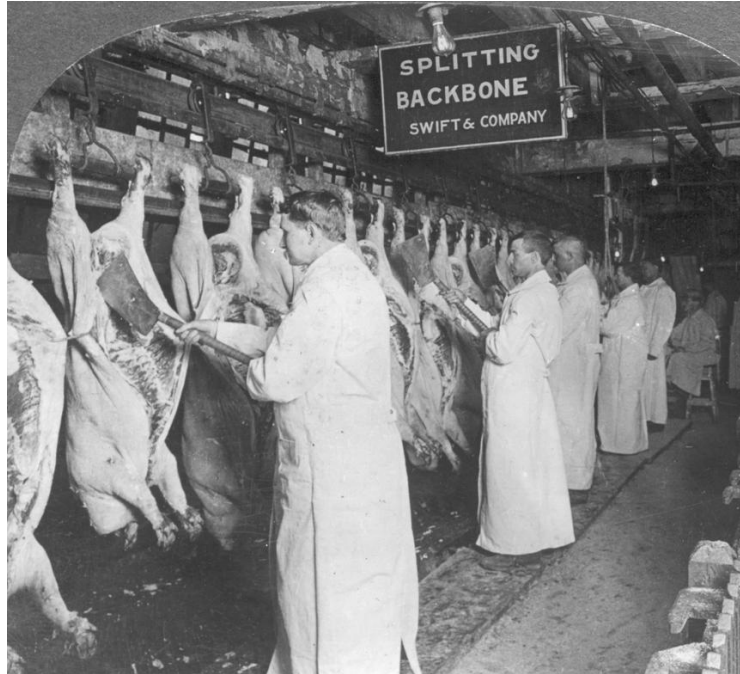
3- \_\_\_\_\_ for each work station

4-Elimination of the many \_\_\_\_\_ needed to bring parts to the assembler. Fewer workers resulted in a lower production cost. The lower cost of production made the Model T more affordable to middle class America.

**1918-** \_\_\_\_\_ of all cars in America were \_\_\_\_\_!

# A Picture is worth a Thousand Words

Picture A:

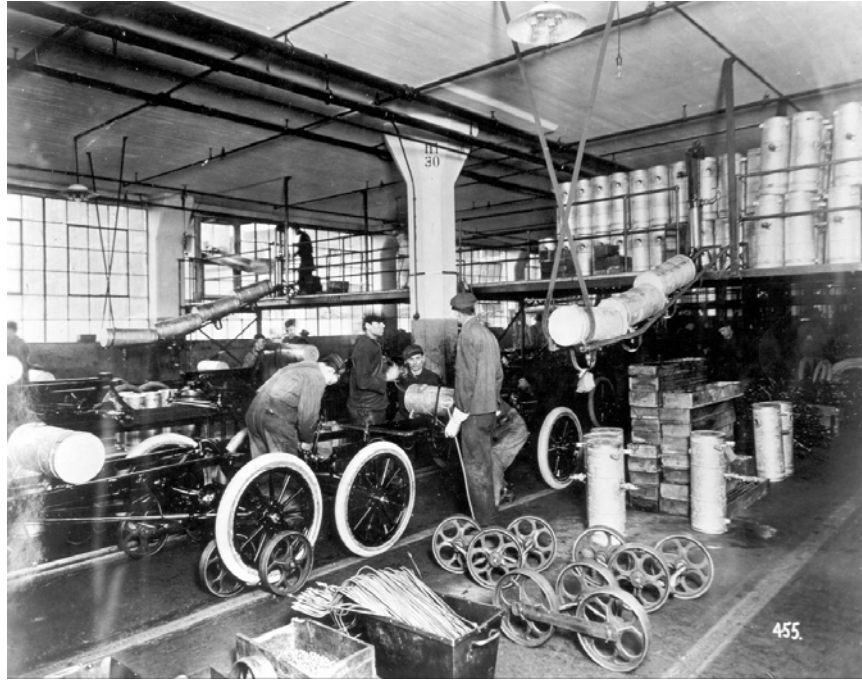


Picture B:

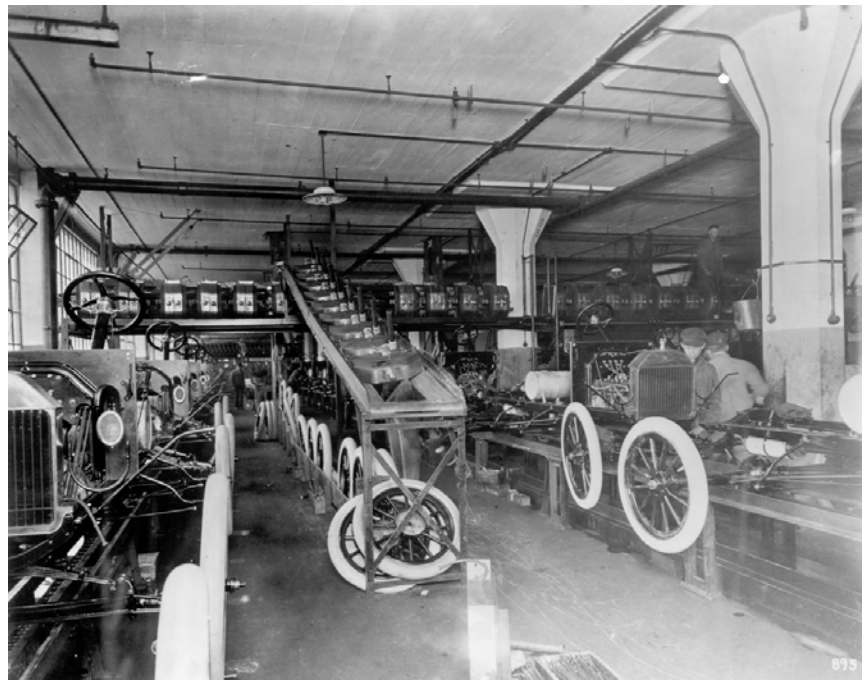


# A Picture is worth a Thousand Words

Picture C:

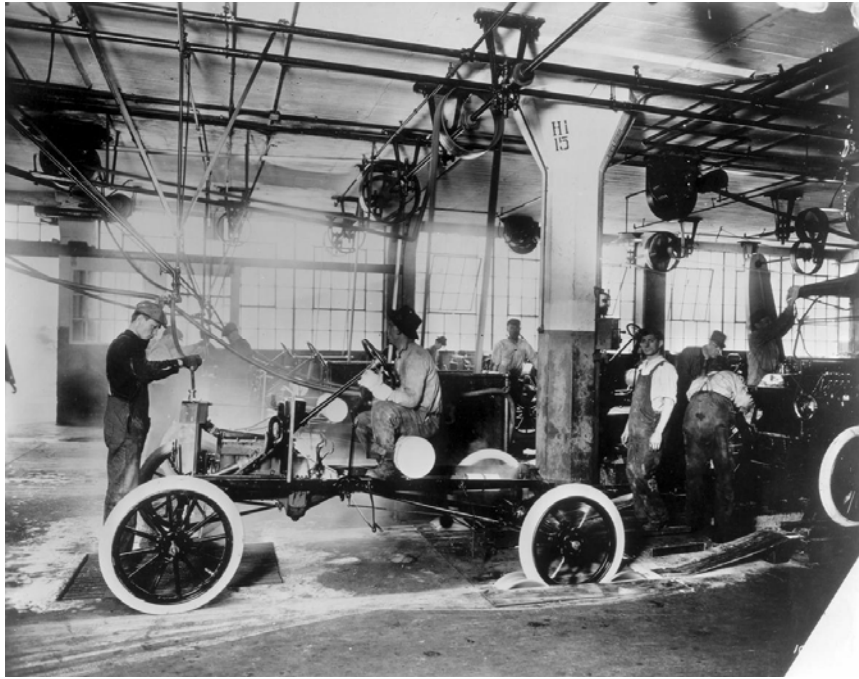


Picture D:

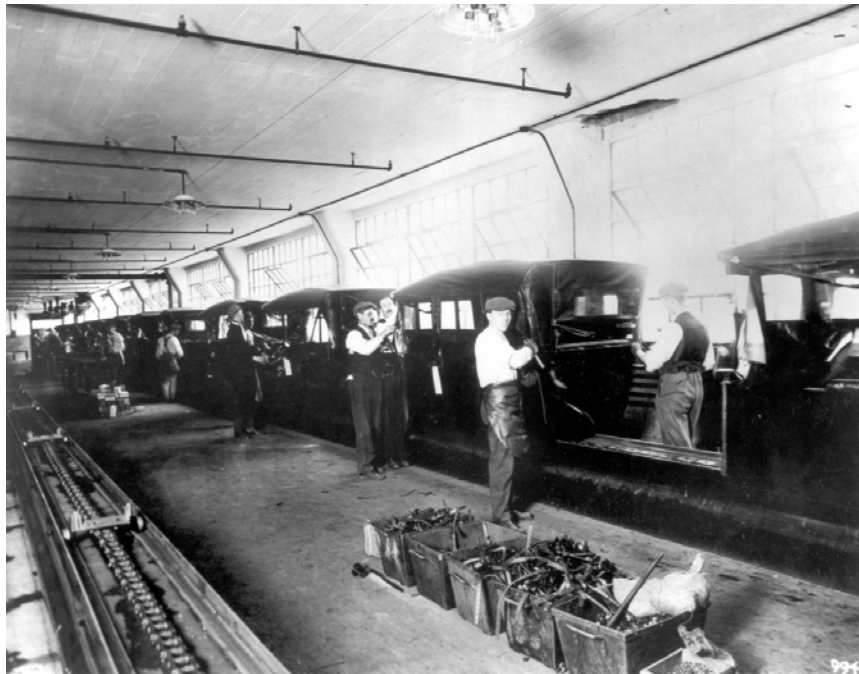


## A Picture is worth a Thousand Words

Picture E:



Picture F:



Name: Key

## **A Picture is worth a Thousand Words**

### Picture A: Disassembly line for hogs, 1915

The meatpacking business was around long before Henry Ford's assembly line and Henry Ford did see some "inspiration" in the process. Look at Picture A, what could Ford have seen that would be put to use in his automotive business?

Students should see the assembly line process. Note the worker standing in the same place while the meat is carried to them on a conveyer system.

### Picture B: Assembly line for magnets on Model T flywheels, 1913

The first product that Ford investigated the efficiency of the assembly line was the flywheel. The Flywheel's purpose is to generate electricity that fires the spark plug. Look at Picture B, describe what methods of efficiency were used in this assembly line? Note the placement of the equipment.

Students should note that the workers hand is in a bin, he is not looking at it because he knows all the parts in that bin are the same. Note the parts bin, and it's location to the worker. This is a good time to point out that the slow workers would be forced to speed up and fast ones to slow down enabling the company to control production. Students may also note such things as the height of the bin for the hand and the product being assembled is about eye sight.

### Picture C: Model T chassis assembly line, installing gas tanks, 1914

Look at this picture and identify the location of the moving conveyer belt. Can you find where the already assembled gas tanks are coming into the factory?

Students should find the conveyer belt is moving the chassis and the gas tanks are coming in from the window on the mid-upper left side of the photo. Point out the worker.

### Picture D: Model T chassis assembly line, installing wheels and radiators, 1914

Can you identify the conveyer belt for the radiators? What other efficient methods can be seen?

Students should find the radiators coming down the ramp on the conveyer belt.



Picture E: Model T chassis assembly line, starting the engine, 1914

Model T's were actually shipped without the bodies. Now look at the picture, what does the man on the left appear to be adding to the engine (hint: radiator)? Can you tell what this Model T touring car is being moved on?

Water is being added by the man on the left and rollers are moving the car.

Picture F: Assembly line installation of tops on Model T bodies, 1915

Can you find  
The first bodies were made by a man whose last name was Briggs. Briggs was the first owner of the Detroit Tigers? Can you find the chain for the assembly line on the left of the photo? What do these men appear to be doing to the bodies?

Chain is on bottom left, and the men are in fact painting and adding fabric.

Name: \_\_\_\_\_

## **A Picture is worth a Thousand Words**

### Picture A: Disassembly line for hogs, 1915

The meatpacking business was around long before Henry Ford's assembly line and Henry Ford did see some "inspiration" in the process. Look at Picture A, what could Ford have seen that would be put to use in his automotive business?

### Picture B: Assembly line for magnets on Model T flywheels, 1913

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### Picture C: Model T chassis assembly line, installing gas tanks, 1914

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Picture F: Assembly line installation of tops on Model T bodies, 1915

Can you find

The first bodies were made by a man whose last name was Briggs. Briggs was the first owner of the Detroit Tigers. Can you find the chain for the assembly line on the left of the photo? What do these men appear to be doing to the bodies?

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What would be some of the benefits of an assembly line...

...for the worker?

...for the employer?

What would be some of the down sides of an assembly line...

...for the worker?

...for the employer?

Name: \_\_\_\_\_

## Henry Ford Assembly Line Quiz

\*This quiz is worth ten points and is graded on content.- John Collins Writing Type II.

1. Summarize the significance of the following steps in the Henry Ford's transportation transformation.

a. Henry Ford develops the Model T and wants it to be affordable.  
(2 points)

b. Henry Ford studies the affects of the assembly line on the flywheel. (2 points)

2. Describe the principles of the Ford Assembly Line. (4 points)

3. What is "division of labor"? (1 points)

4. What is the significance of the interchangeable parts and the assembly line? (1 point)



America's Greatest History Attraction

## Middle School Lesson Plan 7

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<sup>1</sup>

**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](http://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

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<sup>1</sup>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 19th Century. This era is expected to be addressed in-depth and with greater intellectual sophistication in the high school United History and Geography content expectations<sup>2</sup>.

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<sup>2</sup> 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<sup>3</sup>

- territory, including the size of the United States and land use (National Geography Standards 1 and 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.

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

<sup>4</sup> For students with no prior knowledge.

Read timelines and evaluate the information included Create accurate timelines from information gathered Use scale appropriately when reading maps Use scale appropriately to create/evaluate schematics*	Social Science Mathematics	2-4
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* <sup>5</sup>	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 <sup>6</sup>	Student project completion and presentation	Evaluation
1-2 days	2-3 days	3-6 days	3-6 days	2-4 days	1-2 days

<sup>5</sup> Items noted with an asterisks (\*) are skills that are needed for one of the optional project products on Tier 3.

<sup>6</sup> 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 an area to investigate.

Agriculture<sup>7</sup>      Food Production      Communication      Metallurgy      Textile  
Transportation

**Step Two:** During your site visit to Greenfield Village<sup>8</sup> 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.

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<sup>7</sup> 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).

<sup>8</sup> 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 8<sup>th</sup> Grade Humanities Selection Menu

	Activity Description	Student Selection/Comments
<b>TIER ONE</b> <b>Must complete all</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Describe the work that the piece of technology does. Who would use it and in what context (ex: farmers, housewives, skilled technicians)</li> <li><input type="checkbox"/> Trace the development of the technology using a timeline showing the introduction and major improvements or events linked to this piece of technology</li> <li><input type="checkbox"/> Determine the relative cost of the item (compare the cost at the time to average monthly or annual wages)</li> <li><input type="checkbox"/> 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.</li> </ul>	

	Activity Description	Student Selection/Comments
<b>TIER TWO</b> <b>Select One</b>	<ul style="list-style-type: none"> <li data-bbox="345 275 1036 449">□ 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.</li> <li data-bbox="345 457 1036 856">□ 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.</li> <li data-bbox="345 865 1036 1073">□ 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”</li> <li data-bbox="345 1081 1036 1436">□ 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.</li> </ul>	

	Activity Description	Student Selection/Comments
<b>TIER THREE</b> <b>Optional for 10% extra Credit</b>	<ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ 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.</li> <li>➤ 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.</li> </ul>	



America's Greatest History Attraction

## Middle School Lesson Plan 8

Oveta Scott, Fred Lynn Middle School, Woodbridge, VA

<b>Unit Title:</b>	America & The Model T
<b>Grade Level:</b>	Middle School (US History or World History)
<b>Time Frame</b>	6-8 Social Studies
<b>Overview:</b>	This unit America & the Model T will analyze the impact of the automobile, which depending on time and schedule can take from 2 -3 days to complete this lesson.
<b>Unit Goals:</b>	Students will be able to demonstrate knowledge of how social and economic life changed in the early twentieth as a result of improved transportation brought about by affordable automobiles.
<b>Student Profile:</b>	This lesson is for middle grades with a mix of intermediate and low students.
<b>Unit Objectives:</b>	<ol style="list-style-type: none"><li>1. The students will be to recognize how Henry Ford's Model T and the use of the assembly line created an improved automobile industry.</li><li>2. The students will be able to examine how the automobile led to the growth of other transportation related industries.</li><li>3. The students will be able to examine how the automobile industry led to the creation of jobs and greater mobility for Americans.</li></ol>
<b>Assessments:</b>	There will be oral and written material given to the students to observe mastery of the lesson. There will be brief reviews of each lesson before proceeding to the next lesson to ensure understanding.
<b>Re-teaching:</b>	The lesson will be presented in a pace that each student will be able to grasp. There will be a review of the previous lesson before the start of new material. At the end of each lesson the students will orally reflect on the material that was discussed.



## **Instructional Sequence: Day One**

Objective: The students will be able to recognize how Henry Ford's Model T and the use of the assembly line created an improved automobile industry.

Anticipatory Set: As a whole group, have students create a KWL chart on Henry Ford/the automobile. (Use this to open up the conversation and obtain background knowledge)

### Explain

Discuss with students Henry Ford and his accomplishments for developing the Model T and how the assembly line impacted the production process with a power point presentation (part one, slides 1-8). Have students to use a character web to highlight important fact.

### Video

Have students watch United Streaming video on Henry Ford (Discovery History 20<sup>th</sup> century biographies: Prominent Americans 5 min long) only the segment on Ford. Have students to take any notes on the back of the character web while watching the video

### Enrichment Activity

Have students get into groups of five to six to perform an simulation of an assembly line. Students are to put together paper car, the first group to put together the most cars in the time allowed wins a prize (optional).

### Wrap Up/Assessment

On a sheet of line paper, have the students address the following questions in their group to share with the class:

1. What was Ford's vision? How did he achieve it?
2. Why was the Model T the most successful automobile?
3. How did the assembly line change impact production and Ford's vision?

## **Day Two:**

Objective: The students will be able to examine how the automobile led to the growth of other transportation related industries, greater mobility, and the creation of jobs in America.

*Anticipatory Set:* Using a spider web organization chart, as a whole class have students tell what industries are dependent upon the automobile.

*Explain*

Have students examine a brief PowerPoint (part two, slides 9-13) on industries that grew from the automobile and how it led to the creation of jobs. Have students compare to the spider chart discussed earlier.

*Video*

Have students watch United Streaming video – History of Transportation: Automobiles and Trucks (19 min long)

*Enrichment Activity*

Have students get into groups of 5 or six to create a newspaper front page headline or advertisement for jobs. Each group will be given an industry that is impacted by the automobile and one group will create a headline announcing jobs at the Ford Rouge Plant.

*Wrap Up/Assessment*

On a sheet of line paper, have the students address the following questions in their group to share with the class:

1. How did the automobile impact Americans socially and economically?
2. What are the industries related to the automobile?

**Day Three**

*Objective:* The students will be able to demonstrate knowledge of the economical and social impact of how the automobile changed America.

*Anticipatory Set:* As a whole group, have students complete a T-Chart on the automobile then vs. now. Have students give as many responses on the use in the past and how it has evolved in the present.

*Review*

Using the entire Power Point, review with the entire class the lesson on the automobile, emphasizing whole group discussion on the key objective points of the economical and social impact.

Assessment

Have students write an essay on identifying how the automobile impacted Americans in the 20<sup>th</sup> century. Encourage students to include details about Henry Ford and his vision, the economical and social change that occurred.



America's Greatest History Attraction

## Middle School Lesson Plan 9

Paul Olson, Lacier Creek Middle School, Cross Plains, WI

- Title:** Steam!
- Grade level:** 7
- Overview:** This activity will demonstrate the advantage of using steam power over muscle power.
- Central Question:** What advantages does a steam engine have over muscle power?
- Objective:** Have the students realize how difficult it was prior to the age of steam to do ordinary tasks and how that fact restricted the movement and industrialization have the country.
- Anticipated Outcome:** The students will be challenged physically in competitions between themselves and the steam engine. They will then write an essay about their experience.
- Materials Needed:** Handsaw and a 2X4 per class  
Treadmill - 2  
Toy Steam engine – Wileco D18 with generator (\$300)
- Instructional Sequence:**
1. Students will do a reading on steam power the day before (TBD) Textbook?
  2. Teacher hands out copies or shows on overhead of the journal questions that need to be answered. Read and discuss.
  3. Teacher asks for volunteers: one to use a handsaw to saw a board and 1 to walk on a treadmill (2) to simulate a horse and 5 to simulate water power used to cut a board.
  4. Teacher times the students as they cut through the board doing it as fast as they can safely accomplish the cut. Horsepower and waterpower walk/ run on treadmill trying to equal a horsepower with the horsepower and water people taking turns. One horsepower = 746 watts

5. After 15 minutes fire up the steam engine and simulate cutting wood. Use the M60m Hacksaw attachment. (\$25) Follow safety precautions.

6. Teacher hands out or shows on the overhead the comparison questions.

**Assessment:**

Students will journal their answers to the “thinking about” questions provided.

Journal questions to be answered while demonstrations are going on:

- Why did people look for other sources of power?
- Rank each power source in terms of portability?
- Which power source is the technically most difficult to achieve?
- What was the energy source for the human? For the Horse? For the water?
- For the steam engine?
- Which would cost more to operate?
- Which will have the greater endurance?
- What advantages does the steam engine have over the human or horse muscle?
- In what ways can the steam engine be used besides sawing?
- Which power source has the longest lifespan?
- What are the negative aspects to each of the power sources (list 3)?
- What are the positive aspects to each source (list 3)?

Homework:

Respond to this statement in an essay using your observations and journal entries:

Steam power was a revolutionary power source and brought about huge changes in society.

**Evidence/Sources:**

Teacher notes:

James Watt promoted the term ‘horsepower’ as a marketing ploy for his steam engines.

A horsepower is equal to 745.7 watts. It would be difficult however for a horse to sustain that amount of output over a long period of time.

For humans, we can produce short bursts of up to 1500 watts using a human powered generator (a motor with bicycle pedals attached). That's the equivalent to about 2 horsepower for a very short duration (less than a minute?). Humans can't sustain that speed. It is far more likely that we'd drop down to about 200 watts or even less than 100 watts for a very long period (more than a few hours).

Human Power is roughly equal to 0.1 horsepower over a sustained period. It's estimated that just by walking, we could harvest 67 watts of energy.

<http://sensorymetrics.com/tag/human-power/>

## How Steam Technology Works

By Robert Lamb

To witness the incredible power of steam, you don't have to look any further than the eruption of geysers or the explosion of gasses that occurs when lava reaches the ocean. Early man witnessed such sights and has long sought to control the raw power of steam through technology ranging from the basic tea kettle to the modern nuclear power plant.

Regardless of the level of technology involved, steam power comes down to one basic principle: When water is heated to the point of vaporizing, the vaporized water takes up more space than the liquid water did. Different levels of molecular forces because solids, liquids and gases are each hold this together. In solids, the molecules are compact. In liquids, they're further apart. And in gasses, like steam, they're even further apart.

If you heat a can of soup in a fire, the liquid contents will vaporize and eventually expand to the point where the can will explode to release the pressure inside. When this pressure is used to perform a particular task -- like turning a turbine or causing a kettle to whistle -- steam technology is harnessing steam power. The methods of heating, containing, channeling and using steam have changed, but the basic principle remains the same.

Learning to harness the power of steam has been a long process. Greek mathematician Hero theorized the use of steam technology in the second half of the first century. However, it would be well over 1,600 years before the first practical steam engine was created in order to drain water from mines and gardens. The age of steam that followed shaped the course of history by powering the Industrial Revolution, transforming the global shipping industry and revolutionizing modern warfare.

<http://science.howstuffworks.com>

Even more interesting is how the definition came to be. It was originated by James Watt, (1736-1819) the inventor of the steam engine and the man whose name has been immortalized by the definition of Watt as a unit of power. The next time you complain about the landlord using only 20-watt light bulbs in the hall, you are honoring the same man.

To help sell his steam engines, Watt needed a way of rating their capabilities. The engines were replacing horses, the usual source of industrial power of the day. The typical horse, attached to a mill that grinded corn or cut wood, walked a 24-foot diameter (about 75.4 feet circumference) circle. Watt calculated that the horse pulled with a force of 180 pounds, although how he came up with the figure is not known. Watt observed that a horse typically made 144 trips around the circle in an hour, or about 2.4 per minute. This meant that the horse traveled at a speed of 180.96 feet per minute. Watt rounded off the speed to 181 feet per minute and multiplied that by the 180 pounds of force the horse pulled ( $181 \times 180$ ) and came up with 32,580 ft.-lbs./minute. That was rounded off to 33,000 ft.-lbs./minute, the figure we use today.

Put into perspective, a healthy human can sustain about 0.1 horsepower. Most observers familiar with horses and their capabilities estimate that Watt was a bit optimistic; few horses could maintain that effort for long.

Although the standard for rating horsepower has been available for over 200 years, clever car manufacturers have found ways to change the ratings of their engines to suit their needs. During the famous horsepower wars of the 1960s, manufacturers could get higher figures by testing without auxiliary items such as alternators or even water pumps. High ratings backfired when insurance companies noticed them and started to charge more for what they saw as a higher risk. Manufacturers sometimes responded by listing lower horsepower figures, forcing enthusiasts to look at the magazine test reports to determine what was going on. In the early seventies the SAE (Society of Automotive Engineers) stepped in with standardized test procedures and the figures were more consistent.

Between 1922 and 1947, the Royal Automobile Club used a horsepower rating that was the basis for an automobile tax. Multiplying the square of the cylinder diameter in inches by the number of cylinders and then dividing that figure by 2.5 determined the horsepower of an engine. Using this dubious method, what we know of as a 385 horsepower motor found in the 2001 Z06 Corvette would be rated at only 48.67 hp!

There is a metric horsepower rating, although it is rarely used. The two methods are close, with one SAE horsepower equal to 1.0138697 metric horsepower.

One mechanical horsepower also equals 745.699 watts or .746 kW (kilowatts) of electrical horsepower. This means that if you really want to confuse people, you could complain about the 0.0268 horsepower light bulb your landlord has in the hallway as opposed to the mundane 20watt measurement.

<http://www.web-cars.com/math/horsepower.html>



## Staff and Scholar Bios



*2009 Workshop Staff*

## Workshop Staff

### **Paula Gangopadhyay, Director of Education, NEH Project Director**



Paula Gangopadhyay is the Director of Education at The Henry Ford. She is responsible for the leadership, strategic direction, design and development of education. She believes that classroom experiences for all types of learners can be enhanced by the holistic, cross-disciplinary and hands-on educational tools offered by museums. She has a master's degree in history, certification in archival, museum and editing studies and a fellowship in education policy. During her 14-year career, Gangopadhyay has served as curator of education, public programs and visitor services at the Public Museum of Grand Rapids, executive director of the Great Lakes Center for Education, Research and Practice and executive director of the Commission for Lansing Schools Success (CLASS). She was also selected as a finalist for the 2000 Governor's Service award. In addition, she serves on several regional, state and national education boards and panels.

### **Dorothy Ebersole, Curator of Education**



Dorothy is Curator of Education at The Henry Ford and has been involved in developing a wide array of partnerships, programs and materials for teachers and students for the past 16 years at The Henry Ford. Dorothy ensures that all of the educational programs at The Henry Ford are aligned with state standards and grade level expectations. Dorothy received her B.A. in history from Oklahoma State University and completed the Michigan Education Policy Fellowship Program at Michigan State University. Her career in museum education has included employment at the Public Museum of Grand Rapids, The Strong Museum in Rochester, New York, and the Geneva Historical Society in Geneva, New York. She is on the board of directors of the Michigan Council for History Education.



### **Ryan Spencer, Education Coordinator- Special Projects**

Ryan is the Education Coordinator, Special Projects at The Henry Ford. He received his Master of Letters in Museum Studies from the University of St. Andrews, Scotland and his B.A. in History at Hillsdale College, Michigan. Ryan is a Michigan Certified Teacher in History and English and has taught high school courses in two charter schools. Before joining the Education Team, Ryan worked as a presenter in Greenfield Village in the Working Farms and Porches and Parlors Districts. Ryan has additional museum experience through The National Museum of Scotland, Edinburgh; St. Andrews Museum, St. Andrews, Scotland; and the Will Carleton Poor House, Hillsdale, Michigan.

## The Henry Ford Curators

### Bob Casey, Curator of Transportation



Bob Casey is an automotive historian and author of a forthcoming centennial history of the Model T Ford. Bob Casey has combined his love of engineering and of history. He is a graduate mechanical engineer and worked for Bethlehem Steel. He also holds degrees in American history and the history of technology. He has been a historian and curator for the Institute of Electrical and Electronics Engineers, Sloss Furnaces National Historic Landmark, and the Detroit Historical Museum. Since 1991 he has been John and Horace Dodge Curator of Transportation at The Henry Ford. He is a judge at the Meadow Brook and Glenmoor Gathering concourses, and his book *The Model T: A Centennial History* was published by Johns Hopkins University Press in July, 2008.

### Marc Greuther, Curator of Industry and Design



Marc has a B.A from the Courtauld Institute of Art at the University of London, and over twenty years of experience with industrial technology at The Henry Ford. His seven years as a member of the institution's Historic Operating Machinery unit involved him in the operation and troubleshooting of a wide range of artifacts, from 19th century machine tools and steam engines to late 20th century robots and production equipment. His writings for The Society for the History of Technology's journal *Technology and Culture* usually spring from or explore areas where art history and the history of technology overlap.

## Guest Scholars

### Dr. Paul Israel, Rutgers University



Paul is director and general editor of the Thomas A. Edison Papers at Rutgers University. The Edison Papers provides leadership in publishing and developing the documentary legacy of America's most prolific inventor and innovator. To date the project has produced six volumes of *The Papers of Thomas A. Edison* as well as an online edition with over 200,000 document images (<http://edison.rutgers.edu>). In 2005 the Edison Papers received a special Eugene S. Ferguson Prize from the Society for the History of Technology (SHOT) as an outstanding and original reference works that will support future scholarship in the history of technology. The Edison Papers are also working to advance the Edisonian legacy through interdisciplinary initiatives in young and higher education. Dr. Israel is the author of *Edison: A Life of Invention* (Wiley, 1998), which was awarded the Dexter Prize by the Society for the History of Technology. He is also the author of *From Machine Shop to Industrial Laboratory: Telegraphy and the Changing Context of American Invention, 1830-1920* (Johns Hopkins University Press, 1992) and coauthor of *Edison's Electric Light: Biography of an Invention* (Rutgers University Press, 1986).

### Prof. R. Douglas Hurt, Purdue University



Doug received his Ph.D. from Kansas State University and is Head of the History Department at Purdue University. Dr. Hurt is a specialist in American Agricultural History. He is a past president of the Agricultural History Society and has served as the editor of the international journal for agricultural history entitled *Agricultural History*. Dr. Hurt is the author of eighteen books, the most recent being *The Great Plains during World War II*. He is currently writing a book entitled *The Big Empty: The Great Plains during the Twentieth Century* and is conducting research on agriculture during the Civil War.

### **Nancy Gabin, Purdue University**



Nancy was born in New York and grew up in Massachusetts but has lived in the Midwest since 1977. She received a B.A. from Wellesley College and a Ph.D. from the University of Michigan. A faculty member in the Department of History at Purdue University, she teaches courses in American women's history and labor history as well as the United States history survey and a course on the 1960s. Cornell University Press published *Feminism in the Labor Movement: Women and the United Auto Workers, 1935-1975* in 1990. Articles on women, work, and the labor movement have been published in *Labor History*, *Feminist Studies*, *Labor's Heritage*, and the *Indiana Magazine of History* as well as in several anthologies and encyclopedias including *Work Engendered: Toward a New History of American Labor* (ed. Ava Baron), *Midwestern Women: Work, Community, and Leadership at the*

*Crossroads* (eds. Lucy Eldersveld Murphy and Wendy Hamand Venet), *The State of Indiana History 2000* (ed. Robert Taylor), and *The American Midwest* (ed. Richard Sisson, *et al.*). She is completing a one-volume history of women in Indiana and is developing a study of women workers and the political economy of gender in the twentieth-century Midwest.

### **Professor Martin Hershock, University of Michigan-Dearborn**



Marty is an Associate Professor of History and Chair of the Department of Social Sciences at the University of Michigan-Dearborn where he teaches courses on the 19th century United States. He is the author of *The Paradox of Progress* and co-editor of *The Political Lincoln* and *The History of Michigan Law*. Currently, he is completing work on a new book, *Oh Lord Make Haste to Help Me: The Life and Times of Timothy M. Joy, Debtor, 1789-1813*, which will be published by Harvard University Press in 2010.