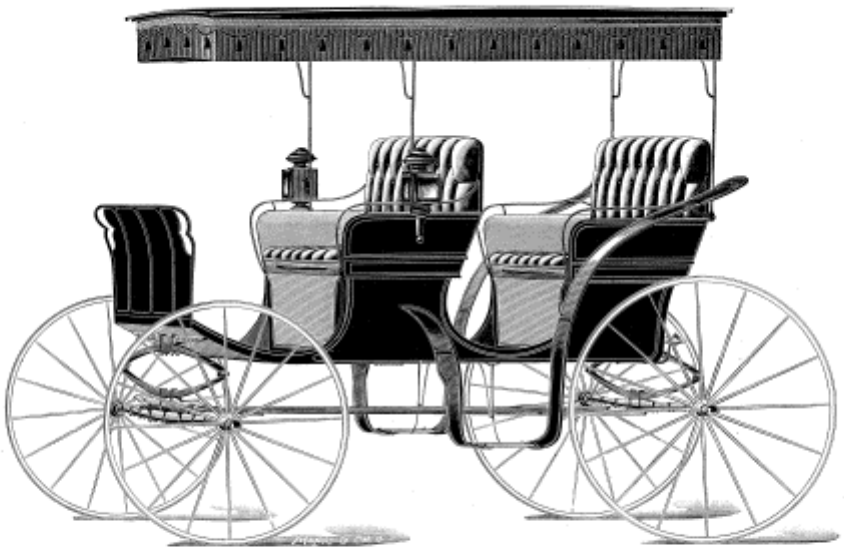
From Horse and Buggy to Horseless Carriage

A Thematic Unit for Michigan's Automobile Industry



No. 340 Eastern.

Famous Blue Ribbon Line

DURANT-DORT CARRIAGE COMPANY, *Flint, Michigan*

Graceful body, bent sill, plain heavy molding. Steel rocker plates and body irons. New style seats, 9½-inch padded panels. Panel spring backs 22 inches high. Cushions 18 x 33 inches on top. All wool, 12-oz. green or blue cloth trimming. Spring cushions. Velvet carpet. Canopy top with stitched patent leather skirt. Oil-burning lamps. Double collar 1⅝-inch dropped axles. Four and five plate, 1¼-inch springs. Sarven or Banded wheels, wishbone grade, 1-inch tire, full bolted. Body painted black, with glazed carmine stripe on moldings. Gear green, two fine lines glazed carmine stripe.

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By Tara Swanapoel

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Unit Overview and Suggested Schedule

Unit Overview: "From Horse and Buggy to Horseless Carriage" is a thematic unit designed to teach students about the history of the automobile industry. It was written specifically for grades 3 and 4, but most of it can be easily adjusted to include any grade from 1 to 8.

Multiple Intelligences: This unit was designed to target each of the eight multiple intelligences. Look for the following symbols at the top of each lesson plan to find out which intelligences are being targeted in a particular lesson.

Kinesthetic
Intrapersonal
Interpersonal
Naturalist
Logical/Mathematical
Verbal/Linguistic
Visual/Spatial
Musical

Technology Integration: At any time during the unit that technology has been integrated, you will see the following icon:

Video Integration: This icon tells you when there is a video as part of a lesson. You will need to get this video from a library or ISD ***in advance.***

Possible Schedule: Below you will find a suggestion for a schedule you might want to use in your classroom. Keep in mind that this is just a suggestion.

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Week 1	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 4
Week 2	Lesson 5	Lesson 6	Lesson 6	Lesson 7	Lesson 7
Week 3	Lesson 8 Lesson 11 – intro (see lesson overview)	Lesson 9	PowerPoint Project Workday	Lesson 10	Lesson 11 - finale
Week 4	Lesson 12	Lesson 12	Lesson 13	Lesson 13	Lesson 14
Week 5	Lesson 14	Lesson 14	Lesson 14 Presentation	Lesson 15	Lesson 15
Week 6	Lesson 15	PowerPoint Project Presentation (Rubric)	Lesson 16 Field Trip	Lesson 16 Field Trip Activity	Unit Culmination and Assessment

* **Each lesson is designed to take one to two days unless otherwise noted.**

Lesson 1 – Michigan, A Manufacturer

Overview: This lesson is designed to give students some background into Michigan's manufacturing history. The details they glean from this lesson and activity will help them understand why the car industry developed and prospered in Michigan. ☺☺

Objectives:

* Students will place cities in Michigan on their proper sites and be able to identify industries in each city.
* Students will describe how transportation helped develop industry and, in some cases, why the industry developed where it did.
* Students will explain where some of the raw material came from and how it was delivered to the site of the manufacture.

Materials Needed:

* Large outline map of Michigan including Great Lakes and Upper Peninsula
* Individual outline maps for each student
* Pencils for each student
* Thin permanent marker for each student
* Miniature post-its or small pieces of paper and glue to add manufacturing icons to map
* Internet access

Procedure:

1. Share background information from "Michigan, A Manufacturer" with students. Michigan, A Manufacturer - Lesson Plan
2. Have students access the following link, click on the "Why Michigan?" link on left side of page, and read the article.
   Factory Gallery
3. Discuss questions in lesson plan.
4. Label major manufacturing cities on Michigan map. Add an icon to show what each city was known for making. Save this map for later use.

Assessment:

1. Participation
2. Map Rubric

Bibliography:

Michigan, A Manufacturer – Lesson Plan: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.michigan.gov/hal/0,1607,7-160-17451_18670_18793-68594--,00.html, 2003.

Factory Gallery: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.sos.state.mi.us/history/museum/explore/museums/hismus/1900-75/erlyauto/index.html, 2003.

Lesson 2 – Carriages Come Before Cars

Overview: The purpose of this lesson is two-fold. Since my age group of students has had limited experience with Microsoft PowerPoint, I have chosen to use this lesson not only to introduce the students to life before automobiles, but also to introduce them to PowerPoint presentations which they will be working with throughout this unit. ☺☺☺☺☺☺

Objectives:

* Students will describe how large the carriage and wagon industry was in Michigan in the late 19th century.
* Students will place the cities in which most of the industry was located onto an outline map of Michigan.
* Students will name the automobile industry as a successor to carriage and wagon manufacturing.
* Students will create an idea for a product that uses as its basis an existing product or current technology.

Materials Needed:

* Computer equipped with PowerPoint
* Projector and screen
* Pre-selected cooperative learning groups of four
* Large drawing paper

Procedure:

1. *Show PowerPoint presentation – "Carriages Come Before Cars"*. (Information from Carriages Come Before Cars - Lesson Plan)
2. Discuss questions found in lesson plan and others that come up from presentation.
3. Follow activity (create a new invention) described in Part 2 of directions in lesson plan. (Activity is also outlined at the end of the PowerPoint presentation.)

Assessment:

1. Participation
2. Invention Rubric – You will need to create a rubric based on the project you assign.

Bibliography:

Carriages Come Before Cars – Lesson Plan: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.michigan.gov/hal/0,1607,7-160-17451_18670_18793-68566--,00.html, 2003.

Lesson 3 – Changing From Horses to Cars

Overview: This lesson is designed to give a brief introduction to the beginnings of the automobile industry in Michigan. ☺

Objectives:

* Students will identify Ransom E. Olds, Billy Durant, and Henry Ford as the men who started the first major car companies in Michigan.
* Students will tell which car company is the biggest today, and who started it.
* Students will predict what might happen if cars today still were steam-powered.
* Students will explain that Oldsmobile, Ford, and GM were not the first car companies to exist.

Materials Needed:

* Textbook: Our Michigan Adventure: Hillsdale Educational Publishers
* "A Tale of Two Cars": Taken from p. 114 of Michigan Activity Masters: Hillsdale Educational Publishers
* Internet Access

Procedure:

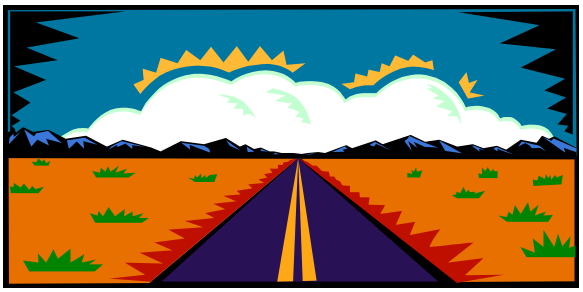
1. Read and discuss pgs. 162-165 (top of page). Some questions to think about are located at the end of the chapter. More are included in the teacher's edition.
2. Have students access the following site to learn more about early cars. Early Cars: Fact Sheet for Children
3. Hand each student a copy of "A Tale of Two Cars." This activity can be completed individually.

Assessment:

1. Participation
2. Trade and Grade (optional): A Tale of Two Cars

Bibliography:

Early Cars: Fact Sheet for Children: Prepared by the Division of the History of Technology, Transportation Collections, National Museum of American History, in cooperation with the Public Inquiry Mail Service, Smithsonian Institution, http://www.si.edu/resource/faq/nmah/earlycars.htm, 2001.



Lesson 4 – Introducing the "Big Three"

Overview: This lesson will introduce students to the beginnings of the first three major car manufacturers of Michigan. This lesson could be extended into a classroom debate. One group of students would defend Ford's idea of building one kind of car and making it cheap. The other group of students would defend Durant's idea of making a variety of cars.

Objectives:

* Students will describe what skills and talents helped the early automakers succeed.
* Students will compare and contrast Ford's and Durant's ideas on how to build a successful car company.
* Students will decide which method (Ford's or Durant's) would be better for today.

Materials Needed:

* A copy of the "Michigan History Magazine for Kids" Spring 2002 Issue for each student.
* If you don't have the aforementioned magazine, use the Internet to access this link: The Beginnings of the Automobile Industry - Pages 1-11
* Internet access

Procedure:

1. Read and discuss "Gentlemen, Start Your Engines" (p.4-10) in magazine.
2. Have students access the following link, click on the "Putting America on Wheels" link on left side of page, and read the article. Factory Gallery
3. Have students list talents and skills that helped early automakers succeed. Write them down and post them in the room.
4. Have students work in pairs to compare and contrast Ford's and Durant's ideas on how to build a successful car company.
5. After a given amount of time, let each student volunteer a comparison to write on the board.
6. In each pair, let students choose which method they think would be better. Have each pair list as many reasons as they can why they think their chosen method would be better today.

Assessment:

1. Participation

Bibliography:

"Gentlemen, Start Your Engines": Michigan History For Kids, Spring 2002.

Factory Gallery: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.sos.state.mi.us/history/museum/explore/museums/hismus/1900-75/erlyauto/index.html, 2003.

Lesson 5 – A Lesson in Microsoft PowerPoint

Overview: This lesson is designed to introduce the students to Microsoft PowerPoint. If the students are already familiar with this program, then this lesson may not be necessary. Students will also be assigned their first long-term project during this lesson. *The teacher must be familiar with the PowerPoint program in order to teach this lesson.* ☺☺☺

Objectives:

* Students will choose a topic (from pre-selected options) to research.
* Students will become familiar with the basics of the Microsoft PowerPoint program (i.e. choosing slides and entering text)

Materials Needed:

* Computers equipped with Microsoft PowerPoint. (Preferably one computer per student.)
* List of pre-selected topics from which the students will choose.

Procedure:

1. Take students to computer lab and walk them through the basics of PowerPoint.
2. Let students choose a topic to research (possibly have students work in pairs). *Their reports will be PowerPoint presentations.*

Assessment:

1. Participation

Possible Topics:

* Henry Ford
* William Durant
* Ransom E. Olds
* The Dodge Brothers
* Charles Duryea
* Karl Benz
* Gottlieb Daimler
* Rene Panhard

Lesson 6 – A Motorcar for the Multitudes

Overview: This lesson is designed to give students an understanding of why Ford started using the assembly line and how it helped the car manufacturing industry. ☺☺☺

Objectives:

* Students will discover what motivated Ford to start using the assembly line.
* Students will tell why Ford increased the wage to $5 a day.
* Students will compare wages from then to the wages from today.
* Students will compare the price of the Tin Lizzie to the price of a new Ford car today. (Inflation taken into consideration.)

Materials Needed:

* Computer equipped with PowerPoint.
* Projector and screen.
* PowerPoint presentation "The Assembly Line and the $5 day."
* "Then and Now" worksheet.
* "I'm Just a Little Pile of Tin" (song)

Procedure:

1. Introduce students to today's lesson by singing "I'm Just a Little Pile of Tin."
2. Show students PowerPoint "The Assembly Line and the $5 Day."
3. Discuss why Ford started using the assembly line and paying workers twice what others made.
4. Have students compare the cost of the Tin Lizzie in 1908 dollars and 2002 dollars. Follow this link: The Inflation Calculator
5. Compare the cost of the "2002 Tin Lizzie" to a modern basic Ford vehicle (i.e. the Escort or similar). Ford

Assessment:

1. Participation
2. Then and Now

Bibliography:

The Assembly Line and the $5 Day: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.michigan.gov/hal/0,1607,7-160-17451_18670_18793-53441--,00.html, 2003.

Lesson 7 – The Amazing Assembly Line

Overview: This lesson is designed to allow students to "experience" the assembly line.

Objectives:

* Students will create and operate a simple assembly line to build cars.
* Students will discuss the advantages and disadvantages of using an assembly line to build a product.
* Students will compare their model with what they learned about the Ford assembly line.

Materials Needed:

* A copy of the "Michigan History Magazine for Kids" Spring 2002 Issue for each student.
* If you don't have the aforementioned magazine, use the Internet to access this link: The Beginnings of the Automobile Industry - Pages 12-17
* Internet Access
* Create a Car on an Assembly Line - Lesson Plan
* LEGO bricks
* Stopwatches

Procedures:

1. Have students access the following link, click on the "The Assembly Line" link on left side of page, and read the article. Factory Gallery
2. Have students read "Moving on Down the Line" from the Spring 2002 issue of the Michigan History Magazine for Kids.
3. Follow instructions on Create a Car on an Assembly Line - Lesson Plan.
4. Assign writing activity **(also found on lesson plan)** in which student will pretend he/she is a line worker, a supervisor, a competitor, or Henry Ford himself. As a worker or a supervisor, the student should write a letter to someone important back home telling them about new jobs at Ford and the new pay plan. As a competitor or Henry Ford himself, suggest that the student write diaries about the same issues or other related issues.

Assessment:

1. Participation
2. Letter or Diary entry

Bibliography:

Create a Car on an Assembly Line – Lesson Plan: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.michigan.gov/hal/0,1607,7-160-17451_18670_18793-53435--,00.html, 2003.

Henry Ford: The Innovator – Background Reading: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.michigan.gov/hal/0,1607,7-160-17451_18670_18793-53436--,00.html, 2003.

"Movin' on Down the Line": Michigan History For Kids, Spring 2002.

Factory Gallery: Michigan Historical Center, Department of History, Arts, and Libraries. http://www.sos.state.mi.us/history/museum/explore/museums/hismus/1900-75/erlyauto/index.html, 2003.

Lesson 8 – Durant-Dort Carriage Company to General Motors

Overview: This lesson is designed to help the students get to know the circumstances surrounding the man who began of General Motors – today's biggest car company in Michigan. You might be surprised; the story ends differently than expected. ☺☺

Objectives:

* Students will predict how the story of William Durant ends.
* After reading his biography, the students will compare reality with their predictions.

Materials Needed:

* Biography of William Durant

Procedure:

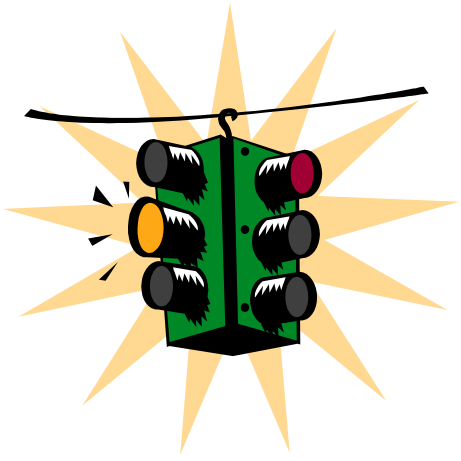
1. Have students predict how William Durant's involvement with GM will affect his life, retirement, etc.
2. Have students read William Durant's biography.
3. Have students compare their original predictions with the new information they discovered after reading.

Assessment:

1. Participation
2. Predictions/Comparisons

Bibliography:

William "Billy" Crapo Durant 1861-1947: http://www.flint.lib.mi.us/timeline/autohistory_0798/durantW.html, accessed 2003.



Lesson 9 – Another Lesson in Microsoft PowerPoint

Overview: The last time we looked at PowerPoint, the students learned how to choose slides and enter text. This time, we will take a look at choosing and using pictures in the presentations. ☺☺

Objectives:

* Students will use the Internet or clipart to find a picture.
* Students will insert the picture in their presentation.

Materials Needed:

* Computers equipped with Microsoft PowerPoint. (Preferably one computer per student.)
* Students should have their presentations on which they have been working.

Procedure:

1. Take students to computer lab and review what they learned last time. Take some time to let them practice those skills.
2. Discuss how to find an appropriate picture from the Internet or clipart. If the picture is from the Internet, teach them how to document where they find it.
3. Demonstrate the Ctrl+C and Ctrl+V functions to gather and paste pictures.
4. Give students time to practice these new skills as well as the other ones.
5. This time may also be used to allow students to work on their projects.

Assessment:

1. Participation

Lesson 10 – Iron Mines to Assembly Line

Overview: Students will get a behind-the-scenes look at the automotive industry and its history. ☺

Objectives:

* Students will watch the video.
* (After the teacher watches the video, she will be able to write more objectives, because right now she is using going on faith.)

Materials Needed:

* "Henry Ford Museum: Automotive History" (Video – Check with your local ISD)

Procedure:

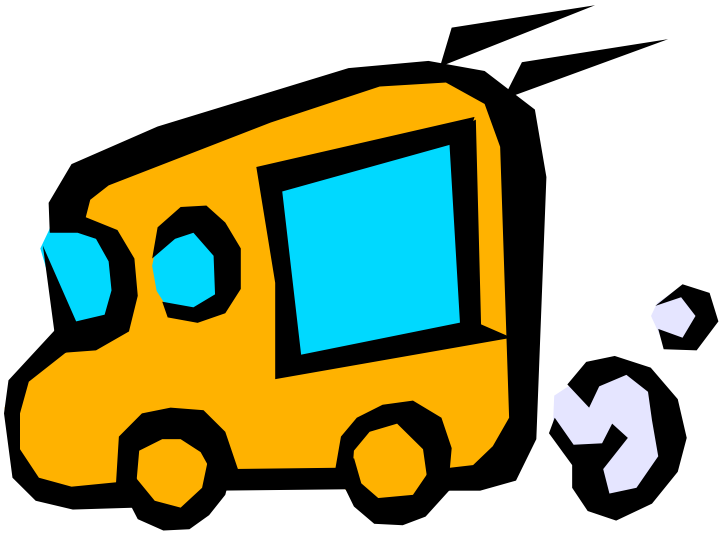
1. Review with students what they have learned about the automotive industry.
2. Pass out video worksheet.
3. Show students video, stopping periodically to allow time to fill in answers on worksheet.

Assessment:

1. Participation
2. Video Worksheet – You will need to create a worksheet to accompany the film.

Bibliography:

Henry Ford Museum: Automotive History: OAKSC, 1999. (Check at your local ISD or REMC for this title.)



Lesson 11 – How the Car Changed America

Overview: We are so accustomed to the convenience of motorized vehicles that it is hard to imagine what our lives would be without them. This lesson provides an opportunity for students to reflect on how the vehicle affects their lives. ***Note: This lesson is designed to take two days spaced one week apart. Please plan accordingly.*** ☺☺

Objectives:

* Students will create a journal detailing every way in which motorized vehicles impact their lives.
* Students will imagine what life would be like today without automobiles.
* Students will write an essay depicting life today without motorized vehicles.

Materials Needed:

* A copy of the "Michigan History Magazine for Kids" Spring 2002 Issue for each student.
* If you don't have the aforementioned magazine, use the Internet to access this link: The Beginnings of the Automobile Industry - Pages 12-17

Procedure:

1. Have students read "How the Car Changed America."
2. Have students begin a journal in which they will detail every time a motorized vehicle impacts their lives. Ask them to be careful observers and go beyond the simple act of riding in a car. Ask them to think about how we receive goods and services, how we perceive entertainment (think of all those video games based on driving a car), how we spend our leisure time.
3. After the week of observation, lead students in a discussion of their journal entries.
4. Have students write an essay about what our lives would be like without automobiles.

Assessment:

1. Participation
2. Journal entries
3. Essay

Bibliography:

"How the Car Changed America": Michigan History For Kids, Spring 2002.

"Teacher's Supplement for the Spring 2002 issue of Michigan History for Kids: The Automobile": http://www.michiganhistorymag.com/kids/pdfs/mhksupp04.pdf, 2002.

Lesson 12 – Automotive Timeline

Overview: Students will have the opportunity to research several events in automotive history and put them in order on a timeline. ☺☺☺

Objectives:

* Students will research and find a date for each event listed on "Automotive Timeline."
* Students will create a timeline.
* Students will put the events in order on the timeline.
* Students will hypothesize why certain events happened at about the same time in automotive history.

Materials Needed:

* Teacher's Supplement for the Spring 2002 issue of Michigan History for Kids: The Automobile
* Automotive Timeline worksheet (available at above link)
* Internet Access
* Paper
* String (or bulletin board strip)
* Clothespins (or thumbtacks)

Procedure:

1. Put students in groups of 2 – 4 (depending on the size of your class).
2. Give each student a copy of the "Automotive Timeline" worksheet.
3. Students will work in their groups to find the date that each event took place. Students may look online at World Book Encyclopedia.
4. After students have found the dates, divide the events up between the groups as evenly as possible.
5. Each student in the group will take an event (or more if there are fewer students in your room) and write it on a piece of paper, illustrate it, and put the correct date on it.
6. As a class, construct a timeline on a bulletin board or out of string.
7. Have the students place the events on the timeline in the correct order.
8. Ask students to analyze what events happened at about the same time and hypothesize why they happened at the same time.

Assessment:

1. Participation
2. Timeline accuracy
3. Automotive Timeline worksheet

Bibliography:

"Teacher's Supplement for the Spring 2002 issue of Michigan History for Kids: The Automobile": http://www.michiganhistorymag.com/kids/pdfs/mhksupp04.pdf, 2002.

Lesson 13 – Cars of Today: A Closer Look at the Cars Michiganders are Driving

Overview: This lesson is designed to have students collect and analyze data about the kinds of vehicles Michiganders drive. ***Note: This lesson is designed to take two days, one for data collection, one for data evaluation.*** ☺☺☺

Objectives:

* Students will list makes of cars by American and foreign automakers.
* Students will observe the traffic outside of the school for a set amount of time.
* Students will collect data to determine the makes of vehicles Michiganders drive.
* Students will analyze their data.
* Students will create a graph displaying their collected and analyzed data.

Materials Needed:

* A road with a moderate amount of traffic. (You will want more than one car an hour☺)
* Tally Sheet
* Graph Paper
* List of American and foreign car companies and their emblems (for student reference)
* Clipboards (one per student)
* Pencils

Procedure:

1. Discuss possible road safety issues with your students. Make sure they know exactly how far back they should be from the road.
2. Give each student the Tally Sheet and a clipboard.
3. Have students sit in a place where they can see the cars on the road, but where they are not in any danger of being too close to the road.
4. As the cars go by (depending on the size of the road, you may want to pick just one direction) have the students make a tally in the American-made or foreign-made area on their Tally Sheet. (For older students, you may want to break down the categories into actual auto makes and/or colors.)
5. After a pre-determined amount of time, have the students return to their classroom with their data.
6. Have the students determine how many of each car they saw. Transfer this number into fraction, percents, etc.
7. Have the students design a graph (or several different kinds of graphs) to show what they found.

Assessment:

1. Participation
2. Tally Sheet
3. Graphical Data

Bibliography:

I have to thank my husband for inspiring this lesson by counting all the GM vehicles as we travel anywhere in Michigan. (Tara Swanepoel)

Lesson 14 – Autos of the Future

Overview: A few days before this lesson, have students start looking at ads in magazines, listening to ads on the radio, and watching them on the TV. Have them note what kinds of techniques the advertisers used to get people to buy the vehicles. This information will help the students as they have the chance to create and advertise their own vehicles. ***Note: This lesson will last more than one day. Set the time for this lesson based on how much time your class needs.***

Objectives:

* Students will analyze present-day automobile advertisements.
* Students will design a concept car of the future for the year 2050 based on design information they learned in the assigned reading.
* Students will create an advertising approach to convince others to buy the vehicle they design.

Materials Needed:

* Cooperative groups
* A copy of the "Michigan History Magazine for Kids" Spring 2002 Issue for each student.
* If you don't have the magazine listed above, use the Internet to access these links: The Beginnings of the Automobile Industry - Pages 1-11
  The Beginnings of the Automobile Industry - Pages 12-17

Procedure:

1. Assign students to design teams.
2. Ask them to review the parts of cars listed in "Car Talk" and design changes in "From Model T to SUV."
3. Ask each team to design a concept car of the future for the year 2050 based on the design information they learned in both articles.
4. Ask teams to develop an advertising campaign for their car. Every student in each team can contribute – some can work on concepts, some can work the concepts into designs, some can draw the car, others can work out the advertising campaign.
5. Once the teams have developed their cars of the future and the advertising campaign for the car, invite another classroom in to listen to the sales pitch for each car.
6. Ask students to vote on the car of their choice.
7. Which car got the most votes? Lead students in a discussion about whether a car like this could really be built in the future and why.

Assessment:

1. Cooperative group participation
2. Project Rubric – You will need to create a rubric based on the project you assign.

Bibliography:

"Teacher's Supplement for the Spring 2002 issue of Michigan History for Kids: The Automobile": http://www.michiganhistorymag.com/kids/pdfs/mhksupp04.pdf, 2002.

"From Model T to SUV": Michigan History For Kids, Spring 2002.

"Car Talk": Michigan History For Kids, Spring 2002.

Lesson 15 – The Downside of Motor Vehicles

Overview: This lesson is designed to take a look at the effect such an abundance of cars have on our planet. ***Note: This lesson is designed to take more than one day. Plan accordingly.*** ☺☺☺☺☺☺

Objectives:

* Students will identify cars as a key cause of pollution.
* Students will identify alternative systems on which cars can run.
* Students will develop a brochure explaining the benefits of hydrogen-powered vehicles.

Materials Needed:

* Internet access
* Paper
* BMW Clean Energy Car Project
* Increase in Transport (resource #1)
* Hydrogen Power (resource #2)
* Transport in the Future (resource #3)

Procedure:

1. Discuss with students the problems of pollution (cars are known for air pollution, noise pollution, and more.)
2. Have students explore this site to learn more about how air is polluted and how this pollution affects them. Air Quality Index
3. Guide students to this website: EPA.
4. Have them click on the "Drive Wise" icon.
5. Discuss what they can do in their families to help reduce pollution.
6. Introduce BMW's hybrid car (it runs on both petrol and hydrogen). For background information on this vehicle, visit this website: Clean Energy Car
7. Guide students through the reading of the three resources listed above. (These are written at a middle to upper grade level, so you will have to do some simplifying for the younger grades.)
8. Have the students work in cooperative groups to complete the BMW Clean Energy Car Project. (Again, this was designed for older students, so adjust it accordingly.)

Assessment:

1. Participation
2. Brochure Rubric

Bibliography:

The Future: Transport in the Future: http://www.bmweducation.co.uk/downloads/cleanEnergy/Future-Trans.pdf, October 2002.

Renewables: Hydrogen Power: http://www.bmweducation.co.uk/downloads/cleanEnergy/Ren-Hydrogen.pdf, October 2002.

Environmental Impact: Increase in Transport: http://www.bmweducation.co.uk/downloads/cleanEnergy/Env-Trans.pdf, October 2002.

Activities: Hydrogen Power – Communicating the Benefits: http://www.bmweducation.co.uk/downloads/cleanEnergy/actHydrogenPower.pdf, October 2002.

BMW CleanEnergy: http://www.bmweducation.co.uk/cleanEnergy/, 2003.

Air Quality Index: United States Environmental Protection Agency, http://www.epa.gov/airnow/aqikids/index.html, March 14, 2002.

What You Can Do to Clean the Air: U.S. Environmental Protection Agency, Air & Radiation, http://www.epa.gov/air/actions/, March 31, 2003.

Lesson 16 – The Detroit Auto Show

Overview: Field Trip!! ☺☺☺☺

Objectives:

* Students will identify concept cars made by various car manufacturers.
* Students will compare the different models.
* Students will each choose their favorite concept car and tell why they decided to choose it.

Materials Needed:

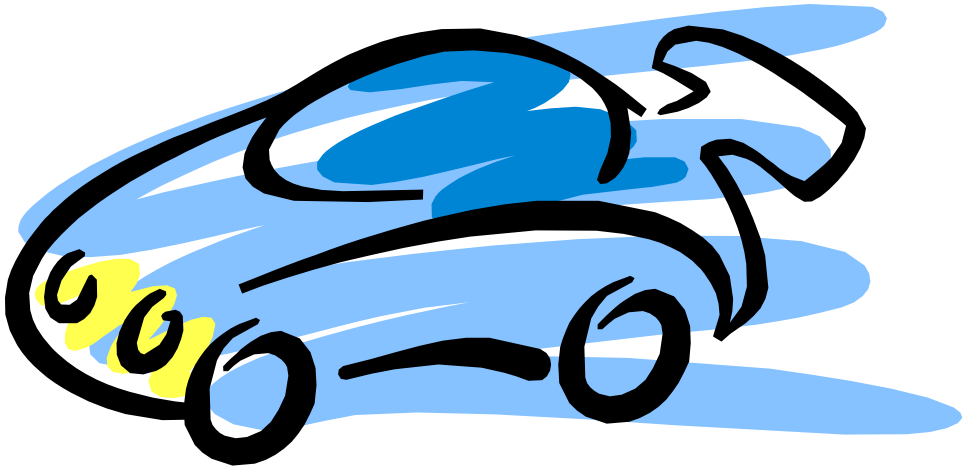
* Transportation

Procedure:

1. Plan a weekday trip to the Detroit Auto Show.
2. While at the show, have students think about which car they like the best. Take digital pictures of students in or around these cars.
3. Upon return to school, have the students make a short PowerPoint presentation depicting which car they liked best and why. Have them use the picture taken at the show.

Assessment:

1. Project Rubric – You will need to create a rubric based on the project you assign.
2. Participation



Unit Culmination and Assessment and Other Useful Information

Assessment: Since each teacher, class, and child is different, there are many different ways of assessing students at the end of this unit. Here are some possibilities:

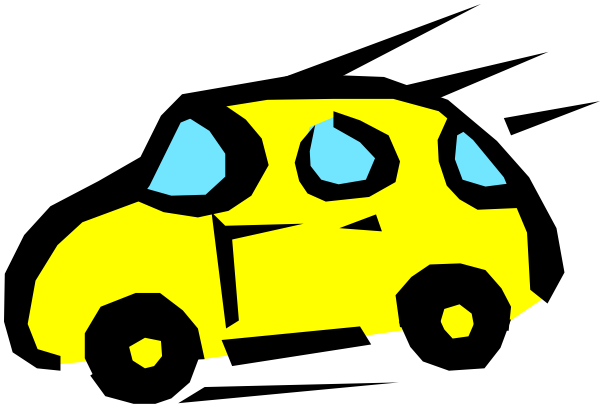
* Written test
* Oral test
* PowerPoint project
* Automobile ABC book

Other Possible Activities: Here are some other ideas that might be fun to try throughout the unit.

* Using LEGO Robotics, discuss the concept of putting cars on "auto-pilot."
* Discuss The Veggie Van, a van that runs on used vegetable oil from fast food restaurants.
* Take the students to the Michigan History Museum in Lansing. They have great displays showing the history of automobiles.
* Visit The Henry Ford Museum, Greenwich Village, or other sites of interest.
* Map the first trip across America taken in an automobile.
* Have the students interview a car owner.
* Have the students pretend they have just purchased a Model T. Write a diary entry describing the experience of being a car owner in a world where cars are just becoming popular.

Other Useful/Fun Links:

* My Dream Car - Lesson Plan
* Early Adventures with the Automobile
* Do an Early Auto Tour
* Early Auto Activities
* The Veggie Van



Carriages Come Before Cars

A Glance at Michigan's Early Automobile History

Michigan in the 19th Century

- Wood was an abundant resource.
- The carriage and wagon industry used a great amount of wood.
- Michigan was one of the top manufacturers of carriages and wagons.
- There were about 125 small companies that each employed a few workers.

Michigan in the 19th Century

- These employees (about 7000) were spread throughout over forty communities around Michigan.
- Three quarters of the workers could be found in one of seven cities:
  - Kalamazoo
  - Jackson
  - Grand Rapids
  - Detroit
  - Pontiac
  - Lansing
  - Flint

Michigan in the 19th Century

- Two carriage-makers from Canada each started a shop in Flint in 1868 and 1869.
- More came in the 1880's.
- In 1898 the 49 largest carriage companies in Michigan produced 371,769 horse-drawn vehicles.

Michigan in the 19th Century

- In 1895, William C. Durant, J. Dallas Dort, and W.A. Patterson began working together as the Durant-Dort Carriage Company.
- This business helped Durant learn valuable skills that he later applied to the automobile industry.
  - Click here to see various carriage models from the Durant-Dort Carriage Company.

Michigan in the 19th Century

- The carriage and wagon industry developed in the state of Michigan because it needed the state's available lumber.
- As the lumber industry began to decline, the carriage industry had to come up with a new product.
- This industry became the bridge between the 19th and 20th centuries as Michigan turned to "horseless carriage" production.

A New Invention

- The invention of the automobile grew from knowledge we already had about carriages, gas engines, and bicycles.
- ***Let's create an idea for a "new" invention based on the technology we already have.***

Our New Invention

- You will work in groups of four to complete this project.
- These are your tasks:
  - Draw our new invention.
  - Develop a "commercial" explaining why people need this new product. Create a "jingle" to accompany the commercial.
  - Decide where it will sell the best and how you will get it there.

The Assembly Line and the $5 Day

Realizing Ford's Dream

The Assembly Line and the $5 Day

- When Henry Ford produced the Model T, he knew this would be the car built so everyone could afford it.
- At first, it was priced similarly to a Cadillac – about $850.
- It was around this time that Ford decided to build a new factory near Highland Park, MI.
- Nicknamed the "Crystal Palace" because of its many windows, it would be the model of efficiency.

The Assembly Line and the $5 Day

- The "Crystal Palace" would use the moving assembly line.
- A massive conveyor belt would bring car parts to the workers, letting each one contribute a small portion of the cars.
- This would speed up the production of cars.

The Assembly Line and the $5 Day

- Faster production meant lower prices.
- Lower prices meant more buyers.

The Assembly Line and the $5 Day

- Ford counted the number of parts required to build his Tin Lizzies, down to the last bolt.
- There were about 5000 pieces.
- Then he took every job, such as installing the headlights, and broke it into individual tasks.
- Each worker on the line would do one task, then wait as the line brought the next car, where he would repeat the task.

The Assembly Line and the $5 Day

- One worker would put a bolt on.
- The next worker would put a washer on the bolt.
- The next would put a nut on.
- The next would tighten the bolt.
- This process reduced every job to its simplest form.
- Any worker could be trained to do the jobs.
- This process also made workers replaceable, and no one could slow down production.

The Assembly Line and the $5 Day

- The next key was timing.
- Each worker had 6 seconds to complete his task.
- Whether he was ready or not, the next car chassis would be in front of him in 6 seconds.
- Supervisors would walk through the factory and time the workers with stopwatches.
- They wanted to make sure production was at its maximum.

The Assembly Line and the $5 Day

- When the company decided it needed more cars coming off the line, it would increase the line speed.
- This forced the workers to go even faster.

The Assembly Line and the $5 Day

- At the time, workers could count on about $2.25 per day, for which they worked nine hour shifts.
- It was pretty good money in those days.
- But many men could not handle the work.
- Men quit working for Ford often.
- Some men just walked away from the line, halting production.

The Assembly Line and the $5 Day

- This increased the cost and delayed production.
- Ford was not able to sell his car cheaply yet.
- Something drastic would have to be done to keep up production and lower prices.

The Assembly Line and the $5 Day

- Hours upon hours of performing the same, mindless, task was very difficult for the workers to accept.
- Morale was often low.
- Also, line work, due to its quick pace and repetitive nature, was dangerous.
- In 1916, the Ford Highland Park plant recorded almost 200 severed fingers and over 75,000 cuts, burns, and puncture wounds.

The Assembly Line and the $5 Day

- To combat the high turnover rate and to boost morale, Henry Ford introduced the famous $5 a day wage.
- Ford's plan doubled the typical wages and sent shockwaves through the other car companies.
- They thought Ford was crazy and would soon go out of business.
- Ford knew, however, that this deal would lower costs by decreasing the amount of workers who would leave.

The Assembly Line and the $5 Day

- Ford also knew that this would create more buyers – the employees themselves!

The Assembly Line and the $5 Day

- The $5 a day rate was half pay and half bonus.
- To get the bonus, employees had to avoid ills such as drinking and gambling.
- They were to learn English and many (mostly recent immigrants) were required to attend classes to become "Americanized."
- Women were not eligible for the bonus unless they were single and supporting a family.
- Men were not eligible if their wives worked outside the home.

The Assembly Line and the $5 Day

- More than 15,000 would-be workers showed up to claim the $5-a-day jobs, though only 3,000 were needed.
- Those left outside were angry.
- Eventually fire hoses were used to disperse the crowd.
- The increased wage led to a stable workforce.

The Assembly Line and the $5 Day

- Ford was soon producing as many as 8,000 Model T's in a single day.
- The priced dropped to under $300 for a brand new car.
- General Motors and other automakers followed suit.
- They also increased wages and began the use of the assembly line.

The Assembly Line and the $5 Day

- Henry Ford had changed the industry forever.

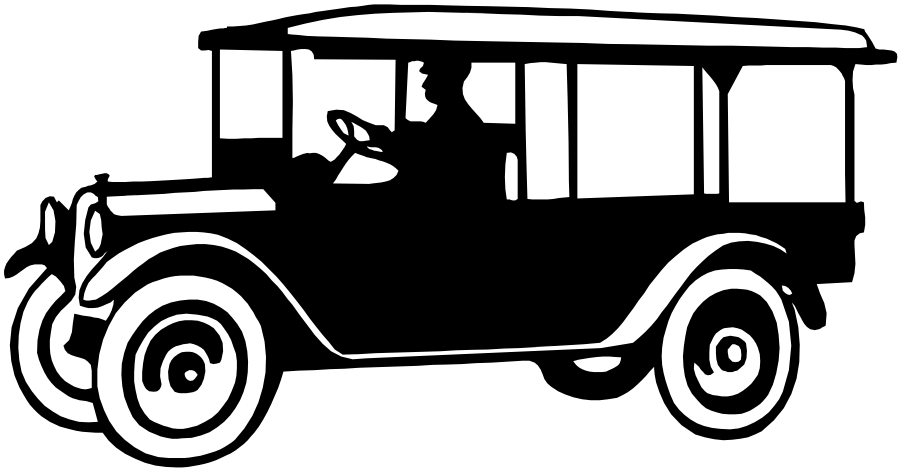
Then and Now

1. What was the wage Ford paid his employees in 1908? _____
2. Using the link to the Inflation Calculator, find out what Ford's famous wage would be in "today's dollars?" _____
3. What was the cost of the Model T in 1908? _____
4. Again, using the Inflation Calculator, find out what the Model T would cost in "today's dollars?" _____
5. Do you think this is more or less than a Ford car might cost today?

   _____
6. Visit Ford's website and find the cost of a new Ford Escort. What was the cost? _____
7. What a new Escort cost in "1908 dollars?" _____
8. Do you think Ford was successful in making a Motorcar for the Multitudes? Why or why not? _____

   _____

   _____



PowerPoint Project

Oral Report - 50 points			
Criteria	**Points Earned^**	**Weight**	**Total**
Presentation*			
*Poise		1	
*Eye Contact		1	
*Voice Quality		1	
*Appearance		1	
Duration		1	
Continuity		2	
Content		3	
Written Report - 10 points			
Neatness		.5	
Format		.5	
Content		.5	
Punctuation Grammar		.5	
PowerPoint Visual Aid - 40 points			
Clarity		1	
Appearance		1	
Connection		2	
Number of Slides		1	
Presentation		3	
Total			

^Grading Scale:

5 points - Excellent *(Few or no mistakes, followed directions completely, beyond expectations)*
4 points - Very Good *(Few mistakes, followed most directions, met or slightly exceeded expectations)*
3 points - Good *(Some mistakes, followed some directions, met minimal expectations)*
2 points - Fair *(Several mistakes, followed almost no directions, did not meet expectations)*
1 point - Unacceptable *(Multiples mistakes, did not follow directions, expectations ignored)*
0 points - Did not complete *(No evidence of being attempted)*

Oral Report

Presentation -

Presentation consists of four different parts: poise, eye contact, voice quality, and appearance. **Poise** is how you carry yourself. Stand tall and look confident. **Eye Contact** with your audience is essential. Can you imagine a pastor who would never look at his congregation? **Voice Quality** is how you use your voice. Speak clearly and loud enough that every person in the room can hear you. Speak with feeling instead of using a monotonous tone. **Appearance** is how you look. Dress nicely on the day of your report. This doesn't mean that you should dress like you are attending church, but take care to look a little nicer on report day. Comb your hair nicely, wear khaki pants, for example, and a nice shirt.

Continuity -

Does your speech make sense? Does it flow like a story or does it jump all over the place confusing the listeners?

Content -

Did you answer all the questions you were able to out of those given to you at the beginning of the Science Unit? Did you add other important information that you discovered?

Written Report

Neatness -

Is your paper neat, clean, and unwrinkled? If you wrote it, is your handwriting the neatest you can do?

Format -

Did you follow the directions given to you for writing or typing the paper?

Content –

(see content from oral report section)

Punctuation/Grammar -

Did you use correct punctuation? Did you use the appropriate tense of your verbs?

PowerPoint

Clarity -

Is your PowerPoint clear enough for your audience to understand?

Appearance -

Is your PowerPoint attractive and colorful, but not too "busy"?

Connection -

Does your PowerPoint go along with your report?

Slide number –

Did you use the minimum number of slides?

Presentation –

Do you use your PowerPoint to assist you in your oral report, *not* depend on it?

Directions: Use this sheet to record the number of American and foreign-made cars you see.

American Cars	
Foreign Cars	

Directions: Use this sheet to record the number of American and foreign-made cars you see.

American Cars	
Foreign Cars	

Directions: Use this sheet to record the number of American and foreign-made cars you see.

American Cars	
Foreign Cars	

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Making A Brochure: CleanEnergy

Student Name _____

CATEGORY	Excellent	Good	Satisfactory	Needs Improvement
Writing - Organization	Each section in the brochure has a clear beginning, middle, and end.	Almost all sections of the brochure have a clear beginning, middle and end.	Most sections of the brochure have a clear beginning, middle and end.	Less than half of the sections of the brochure have a clear beginning, middle and end.
Writing - Grammar	There are no grammatical mistakes in the brochure.	There are no grammatical mistakes in the brochure after feedback from an adult.	There are 1-2 grammatical mistakes in the brochure even after feedback from an adult.	There are several grammatical mistakes in the brochure even after feedback from an adult.
Spelling & Proofreading	No spelling errors remain after one person other than the typist reads and corrects the brochure.	No more than 1 spelling error remains after one person other than the typist reads and corrects the brochure.	No more than 3 spelling errors remain after one person other than the typist reads and corrects the brochure.	Several spelling errors in the brochure.
Writing - Vocabulary	The authors correctly use several new words and define words unfamiliar to the reader.	The authors correctly use a few new words and define words unfamiliar to the reader.	The authors try to use some new vocabulary, but may use 1-2 words incorrectly.	The authors do not incorporate new vocabulary.
Writing - Mechanics	Capitalization and punctuation are correct throughout the brochure.	Capitalization and punctuation are correct throughout the brochure after feedback from an adult.	There are 1-2 capitalization and/or punctuation errors in the brochure even after feedback from an adult.	There are several capitalization or punctuation errors in the brochure even after feedback from an adult.

Content - Accuracy	All facts in the brochure are accurate.	99-90% of the facts in the brochure are accurate.	89-80% of the facts in the brochure are accurate.	Fewer than 80% of the facts in the brochure are accurate.
Attractiveness & Organization	The brochure has exceptionally attractive formatting and well-organized information.	The brochure has attractive formatting and well-organized information.	The brochure has well-organized information.	The brochure's formatting and organization of material are confusing to the reader.
Sources	Careful and accurate records are kept to document the source of 95-100% of the facts and graphics in the brochure.	Careful and accurate records are kept to document the source of 94-85% of the facts and graphics in the brochure.	Careful and accurate records are kept to document the source of 84-75% of the facts and graphics in the brochure.	Sources are not documented accurately or are not kept on many facts and graphics.
Knowledge Gained	All students in the group can accurately answer all questions related to facts in the brochure and to technical processes used to create the brochure.	All students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.	Most students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.	Several students in the group appear to have little knowledge about the facts or technical processes used in the brochure.
Graphics/Pictures	Graphics go well with the text and there is a good mix of text and graphics.	Graphics go well with the text, but there are so many that they distract from the text.	Graphics go well with the text, but there are too few and the brochure seems "text-heavy".	Graphics do not go with the accompanying text or appear to be randomly chosen.