

## Transportation History

### Student Objective

The student:

- will be able to identify major events in the history of transportation
- will be able to explain how transportation ‘fuels’ and fuel efficiency has changed throughout history
- will work cooperatively to create a presentation that communicates information.

### Key Words:

efficiency  
mandate  
prototype

### Time:

½ class for discussion and assignment  
2 - 3 classes for group work (unless assigned as homework)  
1 class for presentations

### Materials:

- Transportation Time Line
- internet access
- Presentation Rubric

### Background Information

See Transportation Time Line

### Procedure

1. **Engage:** Show the video *300 Years of Fossil Fuels in 300 Seconds* (video link in Internet Sites section below).
2. Get your students’ to give their impression of the video. They may want to talk about specific parts of the video, and they may even want to argue with it. Let the discussion progress naturally. At various points, ask the students:
  - do you think the video is accurate?
  - is the video one sided? What is it advocating?
  - is looking at our past important to understanding where we are now?
  - is looking at our past important to guiding our future?
3. **Explore:** Divide the class into groups of three or four students.
4. Explain to the class that they will be creating a presentation on a part of the time line of the history of transportation, and then presenting to the class.
5. Assign a historical theme to each group:
  - pollution regulations
  - mass transit
  - infrastructure (roads)
  - history of combustion vehicles

- history of electric vehicles
  - Other groups you can include if needed are: 2 wheeled vehicles, aircraft, marine craft, race cars, rail transport
6. Tell the students that their presentations should tell a story while answering the question of how we got to this place in history. Tell them to use the timeline as a starting point; that they should do additional research and add more relevant details, people and information to it.
  7. Tell the students that they may get as creative as they wish, that they can do a broad overview (like the video) or focus in on one part or one aspect of history in more depth, that they can use the facts to advocate for one point of view, or they can remain completely neutral. Their presentation could be a skit, a video, a professional presentation, or whatever creative inspiration they have.
  8. Tell them they will be scored on creativity and originality as well as content knowledge and the quality of their presentation.
  9. Assist the groups as necessary while they are working on their presentations.

### **Procedure (presentation day)**

1. Hand out copies of the evaluation sheet and have each student 'x' out their team's row on the table.
2. Have all the students take notes during the group presentations including what they like and dislike about each presentation.
3. **Evaluate:** After all the presentations are completed, have the students complete the evaluation sheet.
4. Collect the group ratings; tally the scores and announce the group with the highest score in each category. Lead a classroom discussion of what was done to make an effective and entertaining presentation, giving credit to as many groups as possible. Agree or disagree with the class ideas as needed. Possible discussion points:
  - What group (or groups) made their topic the most entertaining?
  - What group (or groups) had the most creative and original ideas? Why?
  - What group (or groups) communicated the most historical knowledge?
  - What group (or groups) demonstrated working effectively?
  - Do the class' tallied scores agree with the discussion?

### **Key Words and Definitions**

- **efficiency** - the ratio of useable energy coming out of a process to the total energy being input into a process
- **mandate** - an official order to do something
- **prototype** - a first model of something, especially a machine, from which other forms are developed or copied.

### **Related Research**

1. What are the future trends in transportation? Research what the 'experts' think will be

- the trends in transportation in the future.
2. Research important scientists in the history of transportation technologies.
  3. Prepare a presentation to give to parents, a partner class or the school in general for Earth Day on the history and future developments of alternative fuel transportation.
  4. Watch the video *The Future of Transportation is a Connected World*, by Tech Today, ([https://www.youtube.com/watch?v=e91z1kaO\\_jo](https://www.youtube.com/watch?v=e91z1kaO_jo)) and discuss the modes of transportation that are depicted. How realistic do these ideas seem? Are there any cons or possible problems that can be foreseen in any of them? What new infrastructure would be needed to make them a reality?

### **Related Reading**

- ***Car Wars: The Rise, the Fall, and the Resurgence of the Electric Car*** by John J. Fialka (Thomas Dunne Books, 2015)  
Award-winning former Wall Street Journal energy and environmental reporter, John Fialka documents the history of the electric car from the M.I.T./Caltech race between prototypes in 1968, through the U.S. initial rejection of electric cars until today's growing obsession with the technology.

### **Internet Sites**

**[https://www.youtube.com/watch?v=e91z1kaO\\_jo](https://www.youtube.com/watch?v=e91z1kaO_jo)**

*The Future of Transportation is a Connected World* by Tech Today shows a variety of futuristic transportation ideas.

**<https://www.youtube.com/watch?v=CRwEXaHTwsY>**

*Jay Leno Compares New and 100-Year Old Electric Cars*, Jay Leno drives and discusses a current electric car and his 1907 Baker Electric car.

**<http://www.bbc.com/future/story/20140403-what-will-make-us-ditch-the-car>**

BBC, *Are We Ending Our Love Affair With the Car?*, discusses how we need to rethink our whole transportation system and how driverless, shared vehicles may fit into our future.



## Transportation History

Rate each group on a 1 - 10 scale (with 10 being the highest) for each of the categories. Total each groups score across.

<b>Group # / Name</b>	<b>Historical Knowledge</b>	<b>Creativity &amp; Originality</b>	<b>Entertainment Value</b>	<b>Total Score</b>
	History is accurate and complete	Presentation is creative & original	Did it hold your interest? Was it entertaining?	

Evaluate your own group by answering the questions below:

1. How did you make sure all group member's shared in the responsibility of completing this project?
  
  
  
  
  
  
  
  
  
  
2. What issues or tasks challenged the group?
  
  
  
  
  
  
  
  
  
  
3. What went well?
  
  
  
  
  
  
  
  
  
  
4. How could you improve your group's overall performance?

## Transportation History

## Florida NGSS Standards &amp; Related Subject Common Core

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Nature of Science																					
Standard 1	SC.912.N.1.				X			X													
Standard 4	SC.912.N.4		X																		
Earth and Space																					
Standard 6	SC.912.E.6.						X														
Life Science																					
Standard 17	SC.912.L.17.															X	X		X		
Social Studies Standards		SS.912.A.1.3, SS.912.A.1.5, SS.912.A.3.4, SS.912.G.5.3, SS.912.W.1.1																			
Language Arts Standards		<b>Grades 9 &amp; 10:</b> LAFS.910.SL.2.4 <b>Grades 11 &amp; 12:</b> LAFS.1112.SL.2.4																			
Visual Arts Standards		VA.912.S.1.3																			

**Standard 1: The Practice of Science**

- SC.912.N.1.4 - Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
- SC.912.N.1.7 - Recognize the role of creativity in constructing scientific questions, methods and explanations.

**Standard 4: Science and Society**

- SC.912.N.4.2 - Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.

**Standard 6: Earth Structures**

- SC.912.E.6.6 - Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.

**Standard 17: Interdependence**

- SC.912.L.17.15 - Discuss the effects of technology on environmental quality.
- SC.912.L.17.16 - Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
- SC.912.L.17.18 - Describe how human population size and resource use relate to environmental quality.

## **Social Studies Standards**

### **American History**

- SS.912.A.1.3 - Utilize timelines to identify the time sequence of historical data.
- SS.912.A.1.5 - Evaluate the validity, reliability, bias, and authenticity of current events and internet resources.
- SS.912.A.3.4 - Determine how the development of steel, oil, transportation, communication, and business practices affected the United States economy.

### **Geography**

- SS.912.G.5.3 - Analyze case studies of the effects of human use of technology on the environment of places.

### **World History**

- SS.912.W.1.1 - Use timelines to establish cause and effect relationships of historical events.

## **Language Arts Standards**

### **Standards for Speaking and Listening**

- LAFS.910.SL.2.4 & LAFS.1112.SL.2.4 - Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.

### **Visual Arts Standards**

#### **Skills, Techniques, and Processes**

- VA.912.S.1.3 - Interpret and reflect on cultural and historical events to create art.

## **National Standards**

Note: Related **National Language Arts Standards** are listed in the Florida section above.



## Transportation Time Line

### Before 1 AD

- 3500 BC** Wheeled carts are invented  
Riverboats are invented
- 2000 BC** Horses are tamed and used for transport

### Before 1700

- 770** Iron horseshoes come into common use
- 1492** Leonardo da Vinci describes a flying machine
- 1620** Cornelis Drebbel invented the first submarine - a human oared submersible
- 1662** Blaise Pascal invents a horse-drawn public bus which has a regular route, schedule, and fare system

### 1700s

- 1740** Jacques de Vaucanson demonstrates his clockwork powered carriage
- 1769** Nicolas-Joseph Cugnot demonstrates his 'steam wagon', arguably the first functional automobile
- 1783** Joseph Montgolfier and Etienne Montgolfier launch the first hot air balloon  
First practical paddlewheel steamboat demonstrated by Marquis Claude Francois de Jouffroy d'Abbans

### 1800s

- 1804** Richard Trevithick builds a prototype steam powered railroad locomotive  
Oliver Evans demonstrates a steam powered amphibious vehicle
- 1807** Isaac de Rivas makes a hydrogen gas powered vehicle  
Robert Fulton's steamboat Clermont begins regular passenger service
- 1814** George Stephenson builds the first practical steam powered railroad locomotive
- 1816** Baron Karl von Drais rides his bicycle-type creation while collecting taxes from his tenants
- 1825** First passenger railroad opens in England
- 1853** Sir George Cayley builds and demonstrates the first heavier-than-air aircraft
- 1860** First true bicycle, the "boneshaker", become popular in Europe and America
- 1862** Jean Lenoir makes a gasoline-engine automobile
- 1868** George Westinghouse invents the compressed air brake for railway trains
- 1869** U.S. Transcontinental railroad opens
- 1871** Cable car invented
- 1885** Karl Benz build the world's first practical automobile to be powered by an internal combustion engine
- 1886** Gottlieb Daimler attaches a high speed internal combustion engine to a bicycle
- 1887** First electric street railway opens in Richmond, Virginia

- 1890s** Most larger communities have electric streetcar systems  
**1899** Americans can buy electric automobiles from more than a dozen manufacturers

**1900s**

- 1900** Ferdinand von Zeppelin builds the first successful airship  
First automobile ad runs in the Saturday Evening Post
- 1903** Orville Wright and Wilbur Wright fly the first motor-driven airplane  
Small diesel engine tested in a canal boat by Ruudolph Diesel, Adrian Bochert and Frederic Dyckhoff
- 1904** First school for automobile mechanics opens in Detroit
- 1908** Henry Ford begins selling the Model T, designed for mass appeal, which used ethanol, gasoline, or any combination of the two fuels  
Hydrofoil boats co-invented by Alexander Graham Bell and Casey Baldwin
- 1911** Selandia launched, the first oceangoing, diesel engine driven ship
- 1914** Ford Motor Company develops the assembly line method of automobile manufacturing
- 1916** Woodrow Wilson signs the Federal Aid Road Act which offers federal funds to the states for road building
- 1918** First three color traffic light
- 1920s** Outside cities, automobiles become the primary mode of travel. Suburbs based on automobile transportation begin to develop.
- 1926** Robert Goddard launches the first liquid-fueled rocket
- 1929** First U.S. diesel car - a Packard with a Cummins engine  
First U.S. coast-to-coast bus service opens  
One in five Americans owns a car
- 1940s** Los Angeles and other cities begin to experience spells of severe air pollution, known as "gas attacks".
- 1940** Modern helicopters invented  
First super highway opens
- 1942** V2 rocket covers a distance of 200 km
- 1946** The first commercial motorcycles hit the market
- 1947** First supersonic flight
- 1950** Automobile exhaust is linked to the creation of smog
- 1954** In Los Angeles, dense smog is blamed for causing 2000 automobile accidents in a single day
- 1956** Hovercraft invented  
Interstate Highway Act passed, leading to 44,000 miles of new highways
- 1957** Sputnik 1, the first man-made satellite to be launched into orbit
- 1961** Vostok 1, the first manned space mission, makes 2 orbits around the earth
- 1963** Clean Air Act passed
- 1966** On Thanksgiving weekend, weather conditions in New York City cause air pollution to build up for three days. Pollution levels are blamed for the deaths of 168 people
- 1967** Clean Air Act Amendment requires states to implement air quality standards that were passed in the 1963 Clean Air Act

- 1969** First manned mission to the Moon  
Average automobile life expectancy in the U.S. is 5.1 years
- 1970`** First jumbo jet  
Congress establishes the Environmental Protection Agency  
Clean Air Act of 1970 calls for 90% reduction in automotive emissions from new cars by 1976  
Earth Day is celebrated for the first time. 100,000 people march down 5<sup>th</sup> Avenue in New York City
- 1975** Congress passes the EPA Act which included mandates on fuel efficiency of automobiles  
Unleaded gasoline and catalytic converters appear in response to hydrocarbon and carbon monoxide pollution standards
- 1981** First flight of the space shuttle
- 1989** The supertanker, “Exxon Valdez” spills 11 million gallons of crude oil into the waters of Alaska’s Prince William Sound
- 1996** The first commercially produced electric vehicle in nearly 100 years goes on sale in California
- 1999** The first electric-gasoline hybrid automobile goes on sale in America

#### **2000s**

- 2002** SpaceX is founded on the promise of revolutionizing space technology
- 2004** SpaceShipOne first commercial manned space flight  
First commercial high speed Maglev train starts operation in Shanghai  
Environmental Protection Agency announces the Clean School Bus USA Program
- 2005** First nonstop solo flight around the world without refueling was made by Steve Fossett
- 2006** Tesla unveils its first production vehicle  
The world’s largest passenger plane, the Airbus 380, is developed in France
- 2008** Congress mandates that by 2018 all new cars come equipped with back-up cameras
- 2010** Deepwater Horizon oil spill in the Gulf of Mexico
- 2016** Toyota markets the first commercial fuel cell vehicle, the Mirai  
United Nations’ International Civil Aviation Organization adopts international CO<sub>2</sub> emissions standards for aircraft
- 2017** Tesla begins selling its Model 3, promoted as a more affordable electric car

