



6-9TH GRADE: HISTORY OF TRANSPORTATION

GREEN GUIDE TRANSPORTATION UNITS

Transportation Location: three lessons, history/science (3-6)

Pollution and Evolution: one lesson, science (6-8)

3-D Bike Maps: one lesson, science (6-8)

Marketing Strategy and Transportation: two lessons, health/art (6-12)

The Cost of Transportation: one lesson, science (6-12)

What Do I Stand For?: one lesson (6-12)

Travel Journal: three lessons (6-12)

History of Transportation: two lessons (9-12)



SAFE ROUTES TO SCHOOLS
CURRICULUM

Find our curriculum online at : http://www.saferoutestoschools.org/green_curriculum.html

TEENS GO GREEN



Safe Routes to Schools is a program of the
Transportation Authority of Marin.

Part of the *Marin Safe Routes to Schools Curriculum*. Engaging lessons K thru 12 that include applicable state educational standards.

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UNIT DESCRIPTION

HISTORY OF TRANSPORTATION

Grade 9-12, Short version: 50 minutes.

Long version: 2 sessions of 50 minutes each.

Classroom setting.

INTRODUCTION

“History of Transportation” offers students a general overview of the evolution of transportation in Marin and California from the early days to modern times. Students are given an opportunity to look critically at current transportation systems and the interdependent relationship of transportation with modern cultural norms and values. By looking back through the history of transportation we can understand how the choices we make today will affect our lives and our planet tomorrow. This class encourages students to take action that reflects personal commitment to balance their own mobility needs with the requirements of personal, social and environmental health.



OBJECTIVES

Students will be able to:

- Know some of the history of transportation in Marin and California from the early days to modern times.
- Identify relationships between transportation habits and cultural norms and values.
- Identify a variety of modes of transportation, including alternatives to the private automobile.
- Be empowered with the knowledge that personal choices can make a difference in their own health, the integrity of the environment and the well being of society and future generations.

STANDARDS ADDRESSED

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons that were learned.
2. Students relate current events to the physical and human characteristics of places and regions.

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic, and political trends and developments.
2. Students analyze human modifications of landscapes and examine the resulting environmental policy issues.

MATERIALS

- Projector and screen
- Laptop
- History of Transportation PowerPoint presentation ([available from the SR2S website](#))
- Appendix A: True Costs of Automobile Usage
- Appendix B: Costs of Car Culture
- Appendix C: Individual and Family Car



ADAPTATION

The lesson, as presented, can be done in one lesson of 50 minutes if time for discussions is left to a minimum. If you are unable to extend the lesson into two 50-minute sessions, we recommend that you use your discretion in editing out some of the slides of historical information to allow for a more interactive session. As indicated in the notes with the slides, if you are able to devote two 50-minute sessions to this unit, a good place to divide the lesson is at slide # 23, "Sounds of Modern Transportation."



Cost Calculator

PROCEDURE

1. INTRODUCTION:

How do you define "culture"? This interactive lesson, presented with PowerPoint, invites us to reflect on relationships between culture and transportation. How do transportation choices affect our culture? How does our culture affect our transportation choices? Let's begin by asking, what is "culture"? Generally speaking, culture consists of the beliefs, behaviors, tools/possessions/things in general use, and other characteristics and experiences shared by the members of a particular group. Societal aspects include language, customs, values, norms, mores, rules, tools, technologies, products, organizations, and institutions.

2. POWERPOINT PRESENTATION:

Follow the notes found in each slide.

3. CONCLUSION

After viewing the History of Transportation presentation, questions could naturally arise as whether or not there is anything the students can be expected to do to address and relieve some of the problems and challenges that the presentation highlighted.

High school is the time of one's life when one is becoming independent. There is an almost dizzying high that comes with a growing freedom of choice and freedom of movement in life. For better and for worse the automobile has come to symbolize

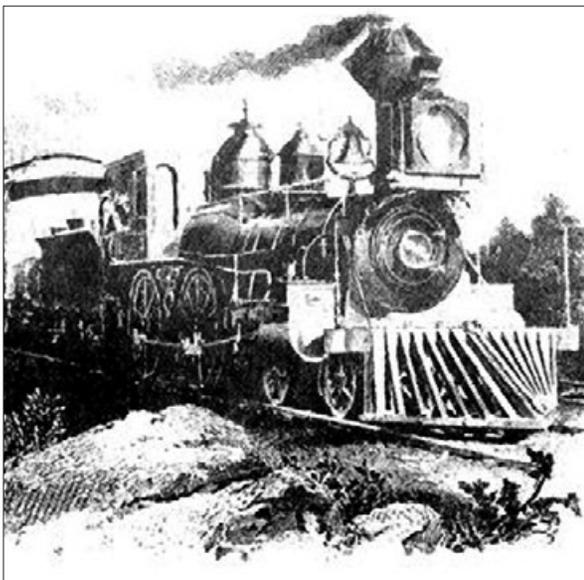
this growing freedom. While it is not realistic to imagine that many will renounce the dream of the having their own private automobile, there are still many things teenagers can do to lessen or mitigate the personal, social, governmental and environmental costs of automobile usage.

Here are a couple of examples:

- According to a 2001 National Household Transportation Survey conducted by the U.S. Department of the Treasury, 41% of all automobile trips are two miles or less, while 27% are one mile or less. Converting short automobile trips into walking or biking trips is one very important way of helping the environment, saving money and improving one's own health, all at the same time.
- The United States Surgeon General recommends 30 minutes of moderate exercise at least three times a week. Riding one's bike or walking to go short distances, or walking or biking to transit for longer trips, are forms of multi-tasking.

These are some ways in which individuals can help themselves, society and the environment.

- Discuss what other ideas the students may have to cut down on the overall (not just financial) costs of their transportation choices. What can they do as individuals? What can they do as a community? (Land use patterns are based on and influence transportation options). Students should be reminded that they can contribute to society not only through their own individual behavior patterns but also by becoming leaders



and participants in group activities, projects and movements.

PROCEDURE CONT.

4. HOMEWORK HISTORY & SOCIAL SCIENCE

The Politics of Transportation.

- Ask the student to research the the political and cultural circumstances of the turn of the century from 19th to 20th and from 20th to 21st.
- How did transportation play a role in shaping the economics of each era?
- What happened when the railroad companies held political power as compared to contemporary political power held by the oil and gas industries of today?
- Have them compare and contrast the similarities and differences between the two eras.

5. CLASS EXERCISE

The Politics of Transportation.

- Divide the class into teams.
- Each team will take on the roll of either those who support the railroad or those who support the automobile. These roles can include the owners, riders, politicians, workers, etc.
- Have them play out the political and cultural circumstances of the turn of the 19th century to the 20th century.
- Then have them play out the turn of the 20th century to the 21st century, keeping the same

roles but playing very different parts in the current political climate.

This will include research into both eras and the circumstances that are common to both centuries.

- Have them include demonstrating the economics, politics, and cultural framework of the times.

6. HOMEWORK

English. *The Phenomenology of Transportation.*

- Ask students to take some time between now and the next class, to pay attention to the sounds of transportation.
- Have students pay close attention to their lived experiences in regards to the various modes of transportation and out of that mindful connection, create a cultural artifact such as a poem. Since our culture places such emphasis on vision and the visual aspect of things, it is recommended that this exploration center on the sounds of transportation.
- Students should spend 10 minutes with their eyes closed and listen to the sounds they hear created by the variety of transportation modes. The location they choose will determine to a large extent the kind of transportation they will hear and respond to (e.g. bike path vs. city street).
- Consider publishing selected poems or

APPENDIX A: THE COSTS OF CAR CULTURE



contacting Safe Routes to Schools in your area to publish these.

An Introduction to "The True Costs of Automobile Usage"

The private automobile has become an integral part of the fabric of U.S. life and lies at the very heart of the American Dream of comfort, convenience and freedom of movement. It is not realistic to imagine that it is going to disappear anytime soon. This makes it all the more imperative that we take a realistic look at the true costs of automobile ownership and operation, so that we can at least make wise choices with regards to its use and the periodic, if not habitual, use of several alternatives that are available (e.g. walking, biking, carpooling, public transit and reducing/combining trips made).

We live in an environment designed for automobiles yet not only our surroundings but also our experience of them is entirely influenced by the automobile. Incased in tons of glass and steel, our cars are artificial environments protecting us from the elements but severing us from them as well, cutting us off from our climate and the feel of warm sun and crisp fresh air or the smell of flowers or the sound of our neighbors' voices. We no longer interact with the people in our community by shopping locally, supporting community owned business and building relationships with local merchants. Children cannot navigate their neighborhoods because of the hazards of traffic. They are denied their independence and must rely on being driven to school, sports activities and friends' houses. This prevents young people from having the important developmental opportunity of exploring their environment and mastering the valuable skills and gaining the confidence which comes from being able to get around on your own.

A certain sense of place has been lost in the transition from neighborhoods to what we now call subdivisions or developments. In the modern suburb people are increasingly isolated from other members of the community. Buffered by private land, fences and hedges, and accessed only by automobile, they are less likely to interact with their neighbors. They are less likely to walk anywhere and tend to spend less time socializing in public spaces, therefore minimizing casual contact with others.

Building schools, shopping centers and other places of interest that are conveniently accessible only by cars can prevent people from safely walking, riding bicycles or playing outdoors. Today youth between the ages of 5-15 do not walk or ride their bicycles as much as they once did. 30 years ago 60% of children walked or

APPENDIX A:

THE COSTS OF CAR CULTURE CONT.

rode bikes to get to school. Today the national average is 13%.

According to the Center for Disease Control and Prevention, a third of adults get little or no exercise. The lack of exercise is one factor leading to a rise in adult and child obesity. More than 3 in 10 adults are overweight, as are one-fourth of youth aged 6-17. According to a county survey, 34% of Marin County children aged 2-17 are overweight at risk or are obese. The CDCP and other organizations are advocating, "Active Community Environments" that promote physical activity and have sidewalks, on-street bicycle facilities, parks, paths, trails and recreational facilities.

The accompanying "True Costs of Automobile Usage" primer divides these costs into four major categories (i.e. Personal, Social, Governmental, and Environmental). The category of Personal Costs is further divided into financial, physical health, and emotional health costs.

Who pays these costs? In some cases it is the producers; in more cases it is the end users; and in an alarmingly high percentage of cases it is society at large, the natural environment and future generations who are being asked to foot the bill. It is in this somewhat murky area of "externalizing" costs, that the oil and automobile industry has thrived and consumers too have been able to create the appearance of an almost free ride. We, as individuals, as members of society and as an integral part of nature can no longer afford to ignore these true costs, but must factor them into our calculations of the cost/benefit considerations that guide our choices and actions.

APPENDIX B:

THE TRUE COSTS OF AUTOMOBILE USAGE



1. PERSONAL COSTS

a. Financial

Car Purchase or Lease, Registration, Emissions Testing, Insurance, Maintenance (including tune-ups and tires), Repairs, Gasoline, Oil, Tolls and Parking.

- The average family in the U.S. spends 15-20% of its annual income on automobile ownership and operation. That's one full day of work each week just to support the car.

b. Physical Health

Pollution related illnesses (particularly respiratory ailments), Obesity and Disabilities and Diseases Related to Sedentary Life Styles and Lack of Exercise.

- More than 15% (1 out of 7) children in the U.S. are overweight or obese.
- According to the Marin County Health Survey, 34% of Marin County children 2-17 are overweight at risk/or are obese.
- The U.S. Center for Disease Control and Prevention estimates that 300,000 Americans die each year due to complications associated with obesity and sedentary life styles.
- In the U.S. car crashes are the leading cause of death of people 1-25 years old.
- Cars have killed over 30 million people since they were invented less than a century ago.

- Vehicles kill one pedestrian in the U.S. every one and a half hours.

c. Mental Health

Stress, Loss of Sense of Place and Connection to the Environment Through Which One Passes (increasing feelings of insecurity and alienation), Loss of Social Interaction, Diminishment of Self Reliance, Loss of Time from Traffic Congestion Caused Delays.

2. SOCIAL COSTS

Diminishment of the Commons, Loss of Sense of Community and Neighborhoods, Decrease in Safety, Decrease in Spontaneous Exchange Opportunities, Paving Over of the Natural Environment, Loss of Agricultural Productivity, Urban Sprawl and the Resultant Homogenization of Communities, Wars Fought to Control Oil Resources, and Civil Liberties Sacrificed in the Conducting of Those Wars.

- Auto infrastructure, including paved roads and parking lots, consume 40-65% of our urban environment.
- The American Lung Association estimates nationwide air pollution related health costs (including the costs of health care and lost productivity) to be billions of dollars each year.

APPENDIX B:

THE TRUE COSTS OF AUTOMOBILE USAGE CONT.

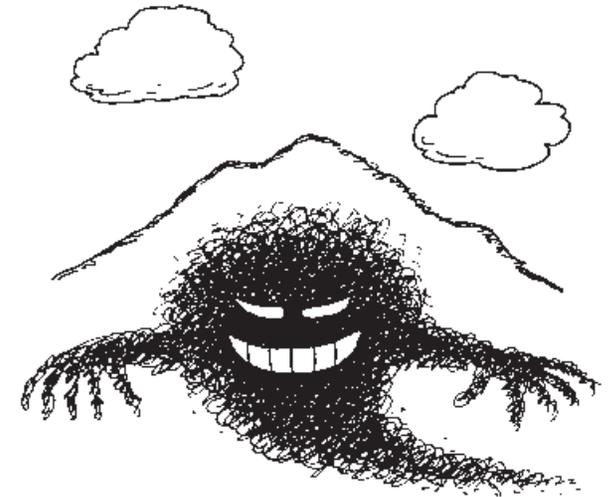
3. GOVERNMENTAL COSTS

Road Construction and Maintenance,
Traffic Signals and Signage, Law Enforcement,
Emergency Services

4. ENVIRONMENTAL COSTS

Air Pollution, Acid Rain, Greenhouse Gases, Global
Warming, Soil Pollution, Water Pollution, Lost or
Degraded Animal Habitat.

- Americans lose an estimated 2,000 to 2,800 acres of rural land every day to highways, housing developments, shopping malls, airports and other non-farm uses.
- Although one gallon of gasoline weighs 6 pounds, when it is burned in a car a single gallon of gasoline produces 25 pounds of CO₂ (a major contributor to global warming) and approximately .8 pounds of carbon monoxide and .08 pounds of nitrogen oxides.
- In addition to pollution from automobiles, herbicides used to kill weeds along roads runoff and pollute rivers, lakes and soil. The same is true of other forms of automotive debris such as bits of tire rubber, brake lining fibers, heavy metals and oil.
- If improperly disposed, oil from one oil change can contaminate a million gallons of fresh water.



APPENDIX C:
INDIVIDUAL AND FAMILY CAR
COST CALCULATOR

Approximate Miles Driven Per Year		(a)
Average Miles Per Gallon		(b)
Total Gallons Per Year (a:b)		(c)
FIXED COSTS:		
Ownership (monthly payments x 12, or purchase price/yrs owned.		(d)
Regular Maintenance		(e)
Insurance		(f)
Registration		(g)
Smog Test and Certificate (divided in half)		(h)
Total Fixed Costs (d thru h)	Subtotal:	(i)
VARIABLE COSTS:		
Fuel at current price/gallon, multiplied by (c)(j)		
Parking (include work, home, meters)		(k)
Unexpected Repairs		(l)
Total Variable Costs (j thru l)		(m)
TOTAL ANNUAL COSTS (i + m)	Total:	(n)
Cost Per Mile (n divided by a)		(o)
Hours Worked Per Week to Support Car		
(n divided by \$/hr net = Hours/Year then divide Hours/Year by 52)		(p)