THE REAL CO$T OF GETTING AROUND

ACTIVITY 5A

OBJECTIVE

to calculate the cost of various modes of transportation

METHOD

Most of this activity can be done individually or in groups of 2-3 students. They may find calculators useful. No other equipment is needed.

If the students have worked individually, once they have completed Data Table #2, they can form small groups to create group data tables similar to Data Table #2 and complete the activity as a group or as individuals. Alternatively, if they started out working in groups, they will need to be guided through the creation of a class data table similar to Data Table #2. They can then answer the remaining questions in small groups or as individuals.

Step #10 of Part A can be done as a homework assignment. The teacher may choose to assign individuals or groups of students to gather the information to determine the cost per mile for each mode of transportation, or can provide the students with the information below.

COSTS OF TRAVEL IN BOSTON MA*

POPULATION DENSITY	HIGH	MEDIUM	LOW
	(CENTS/PERSON MILE)		
Single Occupancy Vehicle (SOV)	93.8	74.4	64.9
High Occupancy Vehicle (HOV)	41.3	33.3	29.3
Commuter Rail	29.0	31.5	60.2
Rail Transit	64.3	75.1	N/A
Bus	58.3	73.8	71.0
Bicycle	12.6	11.8	11.5
Walk	13.5	13.1	14.9

* All costs are in cents/passenger mile based on travel during peak hours and include user costs, governmental costs, and societal costs

Source: Conservation Law Foundation

Carol Wilson

ACTIVITY 5B

This activity may also be done as individual or group work. If students work individually, some may need help in interpreting the data, which is taken from the American Automobile Association 1995 Guide to Travel. Updates of this publication are issued annually, and are available by calling your local AAA.

Question #4 indicates the cost of externalities, or outside factors, that result from use of gasoline. Health care costs include treatment for lung problems caused by atmospheric pollution, deaths and serious injuries received from cars, and standing armies to defend U.S. access to oil. The figures in #4 can be ignored, but can also be used to stimulate interesting discussions and could become the basis of further research for students. If your students have done Chapter 4: We Have To Breathe This Air?, you can remind them of what that lesson taught.

THE REAL CO$T OF GETTING AROUND

The following paragraph was written by Henry Thoreau in the late 1800's in Walden. Thoreau has been called a philosopher, and the first environmentalist. In Walden, Thoreau gets into a conversation with some farmers who are carrying corn to the mill.

One (farmer) says to me, "I wonder that you do not lay up money; you love to travel you might take the cars and go to Fitchburg today and see the country." But I am wiser than that. I have learned that the swiftest traveler is he that goes afoot. I say to my friend, Suppose we try who will get there first. The distance is thirty miles; the fare ninety cents. That is almost a day's wages. I remember when wages were sixty cents a day for laborers on this very road. Well, I start now on foot, and get there before night; I have traveled at that rate by the week together. You will in the meanwhile have earned your fare, and arrive there sometime tomorrow, or possibly this evening, if you are lucky enough to get a job in season. Instead of going to Fitchburg, you will be working here the greater part of the day. And so, if the railroad reached around the world, I think that I should keep ahead of you; and as for seeing the country and getting experience of that kind, I should have cut your acquaintance altogether.

ACTIVITY 5A. LET'S CALCULATE THE REAL COST OF GETTING AROUND.

DIRECTIONS: Read the following questions carefully and answer them as accurately as you can.

1. What method of transportation brought you to school today?_____

2. Why did you use this transportation method_____

_____

3. In a typical week, how many times do you use the following methods of transportation to get to school and home after school:

	TO SCHOOL	HOME FROM SCHOOL		TO SCHOOL	HOME FROM SCHOOL
a) school bus	_____	_____	**d) walking**	_____	_____
b) public bus	_____	_____	**e) family car**	_____	_____
c) bicycle	_____	_____	**f) other**	_____	_____

4. Use your answers to question 3 to complete Data Table #1 below.

DATA TABLE #1		
METHOD OF TRANSPORTATION	**TOTAL NUMBER OF TRIPS PER WEEK**	**TOTAL ESTIMATED DISTANCE FOR EACH TRIP**
school bus	_____	_____
public bus	_____	_____
bicycle	_____	_____
walking	_____	_____
family car	_____	_____
other	_____	_____
TOTALS		

5. If most of your trips were in the family car, explain why you use this method instead of the others for travel to and from school.

_____

_____

6. Do you need transportation at other times, such as going to a friend's house, sports events or music lessons? If so, estimate how many times in a week you need transportation by each of the methods listed below: Write your information in Data Table #2.

DATA TABLE #2				
METHOD	**DESTINATION**	**TIMES/WEEK**	**ESTIMATED MILES/TRIP**	**TOTAL MILES**
public bus to	_____	_____	_____	_____
bicycle to	_____	_____	_____	_____
walking to	_____	_____	_____	_____
family car	_____	_____	_____	_____
other	_____	_____	_____	_____
TOTALS				

7. In groups or with your entire class, create a data table which summarizes the information for all of you. You may also wish to create a graph of this information, comparing the total distance traveled by each method of transportation. If you have been working in groups, each group might share its final data table and graph with the entire class.

8. Which method of transportation provides the greatest number of miles of transportation for your class?_____

9. Do you think this is the most economical and energy-efficient way to get around?_____

10. To find out if you are correct, you will need to find the cost per mile for each method of transportation. You can begin by listing what information you would need and any ideas you have about where to find it.

INFORMATION NEEDED	**WHERE TO GET IT**

Your teacher may ask you to gather some of the information above.

THE REAL CO$T OF GETTING AROUND

ACTIVITY 5B

Information in the table below is provided to help you determine the cost of your personal automobile transportation.

ANNUAL EXPENSES	COMPACT/ SUBCOMPACT	MEDIUM	LARGE
OPERATING COSTS			
Gasoline and oil	4.8 cents/mile	6.0 cents/mile	6.6 cents/mile
Maintenance	2.4 cents/mile	2.6 cents/mile	2.8 cents/mile
Tires	0.9 cents/mile	1.4 cents/mile	1.4 cents/mile
TOTALS	8.1 cents/mile	10.0 cents/mile	10.8 cents/mile
OWNERSHIP COSTS			
Insurance	$ 875	$ 716	$ 783
License, taxes & registration	169	211	228
Depreciation	2636	3099	3484
Finance costs	545	729	783
TOTALS	$4225	$4755	$5254

To determine the total operating cost, multiply the number of miles driven by the total cost per mile. To find the total annual cost of driving the car, add the total operating cost to the total ownership cost. The totals for each of the three cars, if driven 15,000 miles per year, appear below.

Operating cost	$1215	$1500	$1620
Ownership cost	$4225	$4755	$5254
Total annual cost	$5440	$6255	$6874

To determine the cost per mile, divide the total annual cost by the number of miles the car is driven. For 15,000 miles/year, the numbers are as follows:

36.3 cents/mile 41.7 cents/mile 45.8 cents/mile

A car that is driven more miles per year will have a slightly lower cost per mile and one that is driven fewer miles a year will have a slightly higher cost per mile.

*NOTE: Cost of roads, police, etc, are 15 - 35 cents per mile depending on number of cars on the road.

1. If you know how many miles your family's car is driven in a year, locate the car on the data table above and determine its cost per mile _____

2. Copy the information from Data Table 2 onto Data Table 3 below. Use the answer to question #1 above to determine the cost of each trip you took in the family car and the total cost of your rides in the car during a week.

DATA TABLE #3

METHOD OF TRANSPORTATION	TOTAL ESTIMATED DISTANCE	COST/MILE	TOTAL COST
SCHOOL BUS			
PUBLIC BUS			
BICYCLE			
WALKING			
FAMILY CAR			
OTHER			
TOTALS			

3. It may not seem very expensive for you to get rides everywhere in your family car, but think of how much money it costs for a year for you and all of your classmates. How could you calculate this amount?

_____

_____

4. There are additional costs for gasoline-powered automobile travel, ones that are paid by taxes or by others. Below are listed estimates of some of those costs. Recalculate the cost of rides in your family car including these numbers.

Health care costs	79 cents/gallon
Traffic accidents and fatalities	61 cents/gallon
Military protection of oil	37 cents/gallon

(Source: Steering a New Course, by Deborah Gordon, Union of Concerned Scientists, 1991)

5. To make a comparison, we must also know the cost per mile for transportation using the other methods of transportation listed: school bus, public bus, walking and bicycle. Where would you expect to locate information on each of these methods of transportation?

_____

_____

_____

6. You may wish to have each group in your class select one method of transportation and be responsible for determining its cost per mile. Otherwise, your teacher will have some general information to share with you. Once you have the cost per mile of each mode of transportation, complete Data Table #3 above.

7. Which mode of transportation has the highest cost/mile? _____

8. In addition to dollar costs, gasoline-powered automobiles add much pollution to the atmosphere (see Chapter 4) and they use 21% of all US energy (source: Energy, Gordon J. Aubrecht, Prentice Hall, New Jersey, 1995) or nearly 19 quads. Sixty-six percent of this is imported, sending dollars out of the country. Perhaps this is a good time to list the advantages and disadvantages of your travel by automobile.

ADVANTAGES **DISADVANTAGES**

_____

_____

_____

_____

_____

_____

_____

9. What do you conclude about choosing the gasoline-powered automobile as a means of transportation?_____

_____

10. How can you convey your understanding to other students, to your teachers and to your parents? _____

_____

_____