

# Trip Tally: Discovering Environmental Solutions

Grades 3 - 5

<i>OBJECTIVES</i>	<i>MATERIALS NEEDED</i>
<p>Students will:</p> <ul style="list-style-type: none"> <li>• Perform a simple atmospheric experiment</li> <li>• Collect, tabulate, graph, and analyze information on how they get around.</li> <li>• Compare advantages and disadvantages of different forms of travel.</li> <li>• Communicate pollution reducing message on posters.</li> </ul>	<ul style="list-style-type: none"> <li>• One trip tally, trip tally sample, and trip tally graph for each student.</li> <li>• Overheads of trip tally and trip tally graph</li> <li>• Vaseline in a petri dish</li> </ul> <hr/> <p><b>TIME</b></p> <p>Three to four class periods plus minimal class time over two weeks to collect evidence of pollution and personal transportation information.</p>

## ACTIVITY OVERVIEW

As a class, students complete a simple air pollution experiment and discuss what they find. Students discover actions that they already take that help keep our air clean by recording how they get around for one week. They will discover that they can avoid creating air pollution by taking public transportation, carpooling, walking, and other means.

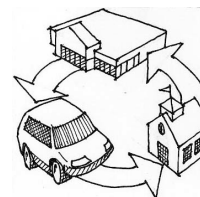
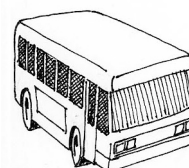
At the end of the week the class tabulates, graphs, and analyzes their data. Students finish up by making posters to give a message about how to save pollution.



## POLLUTION EXPERIMENT

TIME: Minimal class time over one week

Explain to students that, as a class, they will perform an experiment to see if the air they are breathing contains any pollution from automobiles and busses. They will set out two dishes of sticky Vaseline to catch any airborne material that goes by. They will place one dish near the bus drop off area and one in a similar area away from the drop off. The dishes should be open to the air, protected from rain, and safe from foot traffic. Students will collect the Vaseline samples in one week and discuss what they find.



## POLLUTION DISCUSSION

TIME: 30 minutes

Help students examine and discuss what they find in the Vaseline samples.

- *Where did this dirt come from? What are some natural and man made sources?*
- *Is there any difference between the samples? Why?*
- *What happens when there is too much pollution?*

Explain that vehicles are the biggest source of air pollution in our country. Car pollution causes smog, acid rain, and is linked to global warming. Smog is bad for people's lungs and acid rain is bad for fish, plants, and buildings. Smog is especially bad for people with asthma. Global warming may be effecting the world's climates.

- *What are some ways people can reduce pollution from cars?"*  
*"Let's find out what we already do."*

Although individual car emissions have gotten much cleaner in the last 30 years, car use has increased enough to offset most of this gain. For some emissions, such as carbon monoxide - a poisonous gas, overall emissions have actually increased.

## TRIP TALLY SURVEY

TIME: 30 minute class period plus 5 minutes daily for a week.

INSTRUCTIONS:

Explain that by keeping track of how each student gets around, the students can determine how they already help reduce pollution and can get ideas on how to do a better job.







Review the trip tally using the overhead projector. Explain that students will use the trip tally to record "Car Trips" and "Saved Car Trips." Explain that they will use an "X" to record every time they ride in a car and a check "✓" to record every time they save a car trip.

To complete a Trip Tally, fill out one row for each trip.

Enter:

1. the day of the trip,
2. the kind of transportation used, and destination,
3. an "X" in the "all car trips" column if a car was used, and
4. a check "✓" in the appropriate column for each car trip saved.

Note: A "trip and back" may be entered on one row, with all ✓s and "X"s increased accordingly.

NAME:		CLASS:							
Give Your Car a Break - Trip Tally - (✓ saved car trips!)		All Car Trips	Saved Trips						
		Carpool	Combined	Bus/Train	Bike	Walk	Other		
									
Day	How you got where	X for each car trip	One ✓ for each extra person	One ✓ for each extra person	One ✓ for each trip	One ✓ for each trip	One ✓ for any non saved trip		
Total Car Trips									
Total SAVED Car Trips!									

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Note: Grades 5 and up are encouraged to use actual miles instead of "X"s and "✓"s. See NESEA's website for a trip log set up to use miles.

Use the following guidelines for Saved Car Trips:

**Carpool:** Place a check “✓” for each extra passenger in a carpool.  
(Don’t count the driver. A driver, one student, and one other passenger are considered to be one extra passenger for this exercise.)

**Combined Trip:** Place a check “✓” for each extra purpose in a trip. (A trip to the grocer, work, and school is two extra trips.)

**Bus Ride:** Place only one check “✓” for each bus ride, no matter how many people are on the bus.

**Bike or Walk:** Place a check “✓” for each trip you use a bike or walk.

**Other:** Place a check “✓” for any other method that saves a car trip.

NAME: Joe Biker		CLASS: Ms. Carpool, 4th Grade						
Give Your Car a Break - Trip Tally - (✓ saved car trips!)		Saved Trips						
		All Car Trips	Carpool	Combined	Bus/Train	Bike	Walk	Other
Day		X for each car trip	One ✓ for each extra person	One ✓ for each extra purpose	One ✓ for each trip	One ✓ for each trip	One ✓ for each trip	One ✓ for any saved trip
Monday								
Rode bus to school and back					✓			
Rode car to friend's, store, and movies		X	✓	✓				
Phoned to learn didn't need to go shopping								✓
Tuesday								
Rode car to school (one way)		X						
Took bus home from school								
Biked to the playground and back					✓			
Wednesday								
Took bus to school and back					✓	✓		
Walked to the store and back for cards							✓	✓
Thursday								
Walked to school and back								✓
Took car to go bowling with 3 friends		X	✓	✓				
<b>Total Car Trips</b>		3						
<b>Total SAVED Car Trips</b>			3	2	5	2	4	1

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Have students record trips every day for one week.

## CLASS TRIP TALLY TOTALS

TIME: 30 minute class period

At the end of the week, have students total their data for each column of the trip tally. Working in groups or as a class, tabulate class totals for each column of the trip tally.

## TRIP TALLY: GRAPHING AND ANALYSIS

TIME: 45 minutes

Pre-class preparation: Tabulate all possible trips by adding the class’s total car trips to all saved trips. Set up the trip tally graph to accommodate this number. Write in graph numbers on the sides of the graph.

Pass out the trip tally graphs and display one with an overhead projector. Review how each method of transportation reduces pollution.

NAME:		CLASS:									
		Trips Saved						Total saved trips	Total car trips	Total possible trips	Number of trips
		Carpool	Combined	Bus/Train	Bike	Walk	Other				
Number of trips											
120											120
110											110
100											100
90											90
80											80
70											70
60											60
50											50
40											40
30											30
20											20
10											10
0											0
Totals											

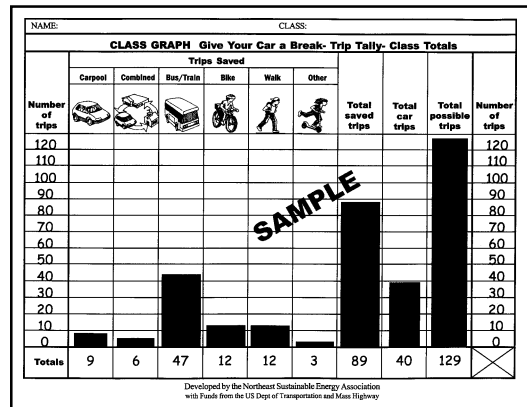
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Discuss with the class:

- *What was your favorite way to save driving trips?*
- *What did you like about saving trips?*
- *What didn't you like about saving trips?*

Demonstrate on the overhead how to represent category totals on the graph. Write the category totals below the appropriate bar.

Have students complete and color their trip tally graphs. [You may want to suggest that they use colors that represent pollution or clean air as appropriate.] Advanced students may total car trips saved from all "saved" categories while others are still completing their graphs.



Discuss with the class:

- *What was the class's best way to save car trips?*
- *Did they know this method helped the environment?*

Add up the total car trips saved from all "saved" categories, if not already completed. Graph the 'Total Saved Trips' and the 'Total Car Trips' in their respective columns.

Discuss with the class:

- *If more trips were saved than driven, does that mean the air is less polluted than if no cars were driven?*
- *If all trips were taken by single passenger cars how many trips would have been taken?*

Add 'Total Saved Trips' and 'Total Car Trips' to get 'Total Possible Trips' and fill in this chart category.

Discuss with the class:

- *Transportation produces one-third of the air pollution and greenhouse gases in the U.S. Is saving trips a good way to reduce pollution? Why or why not?*
- *How can you reduce driving trips in the future?*

Did you know that your choice of transportation is the single most important environmental decision you make? Transportation uses 67% of all oil used in the United States, and produces one-third of the air pollution and greenhouse gases.

## STUDENT POSTERS

TIME: 30 minutes

Have the students make posters describing ways to reduce air pollution. Have them include the ways they learned in the lesson. Display the posters in the school or work with others in your community to display them in public. Students may want to make a calendar out of their posters.

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## EXTENSION ACTIVITIES

**Global Warming:** Carbon dioxide (CO<sub>2</sub>) is a greenhouse gas believed to be causing global climate change. The average vehicle (22.5 mpg\*) produces approximately 1 pound of CO<sub>2</sub> for every mile driven.† Estimate the average trip distance and multiply by the number of trips saved. This will give an estimate of the vehicle miles saved which is roughly equivalent to the number of pounds of CO<sub>2</sub> *not* produced.








**Earth Day:** Use this lesson to engage students in community Earth Day activities. Combine and publicize class tally results. You may want to make the point that Earth Day is a time for people to work together to discover how they can protect the earth. Students made recycling happen. Maybe they can make a comparable impact on pollution from automobiles!

**Transportation Technology Demonstration:** One way to reduce pollution is through saving trips. Another way is to use cleaner transportation technologies. NESEA offers a “Guide to Speakers and Demonstrations” that can help your school host an expert on transportation issues or hold a transportation technology demonstration. Another option is to take your class on a field trip to a green transportation demonstration such as the NESEA’s American Tour de Sol, the U.S. electric vehicle championship. This event offers educational talks and guides that will take your class to see a wide array of alternatively powered vehicles.

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\* Bureau of Transportation Statistics. 1997. US Department of Transportation

† [www.fueleconomy.gov](http://www.fueleconomy.gov)

NAME:		CLASS:						
<b>Give Your Car a Break</b> <b>- Trip Tally -</b> <b>( ✓ saved car trips!)</b>		Saved Trips						
		All Car Trips	Carpool	Combined	Bus/Train	Bike	Walk	Other
Day	How you got where	 X for each car trip	 One ✓ for each extra person	 One ✓ for each extra purpose	 One ✓ for each trip	 One ✓ for each trip	 One ✓ for each trip	 One ✓ for any new saved trip
		<b>Total Car Trips</b>						
		<b>Total SAVED Car Trips!</b>						


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NAME: Joe Biker

CLASS: Ms. Carpool, 4th Grade

## Give Your Car a Break - Trip Tally - ( ✓ saved car trips!)

### Saved Trips


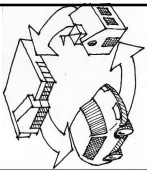




Day	How you got where	All Car Trips	Saved Trips						Other
		 X for each cartrip	 One ✓ for each extra person	 One ✓ for each extra purpose	 One ✓ for each trip	 One ✓ for each trip	 One ✓ for each trip	 One ✓ for any new saved trip	
Monday	Rode bus to school and back			✓					
	Rode car to friend's, store, and movies	X	✓						
	Phoned to learn didn't need to go shopping								✓
Tuesday	Rode car to school (one way)	X							
	Took bus home from school			✓					
	Biked to the playground and back				✓	✓			
Wednesday	Took bus to school and back			✓					
	Walked to the store and back for cards						✓	✓	
Thursday	Walked to school and back							✓	
	Took car to go bowling with 3 friends.	X	✓✓						
Total Car Trips		3							
Total SAVED Car Trips!		3	2	5	2	4	1		1

Please send class results to NESEA at [tally@nesea.org](mailto:tally@nesea.org).

NAME:

CLASS:

**CLASS GRAPH Give Your Car a Break- Trip Tally- Class Totals**

Number of trips	Trips Saved						Total saved trips	Total car trips	Total possible trips	Number of trips
	Carpool 	Combined 	Bus/Train 	Bike 	Walk 	Other 				
<b>Totals</b>										

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NAME:

CLASS:

**CLASS GRAPH Give Your Car a Break- Trip Tally- Class Totals**

Number of trips	Trips Saved						Total saved trips	Total car trips	Total possible trips	Number of trips
	Carpool	Combined	Bus/Train	Bike	Walk	Other				
120										120
110										110
100										100
90										90
80										80
70										70
60										60
50										50
40										40
30										30
20										20
10										10
0										0
<b>Totals</b>	9	6	47	12	12	3	89	40	129	

SAMPLE

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