

## Investigating Options for Sustainable Transportation

### Brief description

Students begin by reading a backgrounder on sustainable transportation, then conduct research into options for transportation that could be implemented where they live. The final product is a community transportation plan that incorporates maps and descriptions of required technologies, communicated by means of a report and/or presentation to the class.

### Learning objectives

- describe some of the environmental and social concerns that arise from modern transportation systems in urban centres
- conduct research into alternative transportation technologies and systems
- critically evaluate a range of transportation options
- develop a written and/or oral report that communicates their findings regarding sustainable transportation

### Length of time

Three to four class periods

### Materials

- Traveling Light backgrounder on sustainable transportation, class set
- Getting There from Here task sheet, class set
- Computers, scanner, printer, LCD projector (all optional)
- Access to Internet, school library, and other research sources
- Transparency of The Impacts of Transportation (prepared in advance, copied onto transparency film from the colour copy master provided)
- Copies of local municipal maps, transit system maps, city road maps (one map per student group)

### Procedure

#### Period 1

This activity is designed to introduce students to the economic, environmental, and social issues associated with transportation. The backgrounder will provide students with a foundation from which they can begin to conduct meaningful research into transportation issues and solutions to transportation problems.

- Introduce the topic. Listed below are some transportation trivia points that will help your students begin to think critically about transportation issues:
  - The average North American driver spends about 1600 hours per year either driving in a vehicle, or working to earn money to pay for and operate a vehicle. This amounts to about 200 8-hour days.
  - The average Canadian spends about \$7,400 annually to own and operate a vehicle, more than he or she will spend on food, housing, education, or recreation.
  - On average, each of the approximately 20 million vehicles in Canada emits about four tonnes of pollutants into the atmosphere. An additional one tonne of pollution is emitted by the refineries that produce the fuel for the 20 million vehicles.



- Worldwide, more than 250,000 people die every year in fatal vehicle accidents, and more than 10 million are injured.
- Transportation impacts brainstorm activity: (15 minutes)  
Use the transparency slide to engage your students in a brainstorming activity around the impacts of vehicles. Try to explore both the environmental and social impacts of transportation in Canada. Sample results of one such brainstorm are provided below. If necessary, prompt your students to think first about the direct environmental impacts of automobiles; then extend the inquiry to include secondary and tertiary impacts, such as from the manufacture of cars. This activity should result in a complex diagram that illustrates the point: Our dependence on cars results in complex and far-reaching consequences with respect to local and global ecosystems, human health, safety and economics.
- Assign the backgrounder reading: (remainder of class)  
Provide copies of the sustainable transportation backgrounder to your students. The backgrounder ends with questions, which may be answered in a written assignment, or verbally discussed in a later class.

### Period 2

Preparation: In advance of the class, identify and list several outlying neighbourhoods and one or two “bedroom communities” where people that work in your town or city live.

- In this class period, review the background reading with the students. Use the questions in the backgrounder to guide the discussion.
- Before the beginning of the class, divide students into groups of two or three, or allow them to form their own groups. Make a class set of the student task sheet, “Getting There from Here.”
- Assign each group with a suburban location and ask them to conduct research on transportation options for people living in that location who need to commute to the city centre.
- Provide the students with copies of the “Getting There from Here” student task sheet and a copy of a municipal or city map. The students will be using these maps to determine the viability and best routes for people commuting from their assigned locations to the city centre using three transportation options: public transit, bicycle, and personal automobile.
- The students will need most of the period to complete their research. Check on their progress toward the end of the period.
- To conclude the class, remind the students that, in the next class, they will be need to submit a written report, or be prepared to deliver a presentation outlining the results of their research (or both).

### Period 3

Preparation: Divide the class period into 15-minute segments and schedule the students’ group presentations into these time slots. If groups are using digital communication software and hardware to make their presentation, they should record their slides on a CD ROM or floppy diskette prior to class.

- Remind the groups that they have a maximum of 15 minutes for the presentation, including time for set-up and questions.



- After the presentations, summarize the major points of each of the groups. Ask the students to propose, based on the presentations, how they think a mayor and city council would prioritize issues of urban transportation.
- Have the groups submit any written work for evaluation.

### Evaluation

Students' comprehension and achievement may be evaluated on the basis of the presentation and / or written assignment.

### Tips and extension activities

Set up a model municipal planning process. Assume that the city is holding public meetings to gather ideas on ways to improve the economic health and reduce the environmental impact of the city's transportation system.

Have the student groups prepare to make presentations to the mayor and city council based on their findings. You may wish to have the student groups represent different stakeholder interests, such as a bicycle commuters' society, a public transit advocacy group, and a downtown retail merchants' association. Submissions should be kept to one page, and presented by a spokesperson elected by the group. Debrief this activity summarizing the issues raised by the various groups, and describing and discussing the likeliest decision that the mayor would make based on the submissions of the groups.

Conduct a survey of students to see what vehicle choices predominate in the demographic represented by your class. Simply tally the number of vehicles owned by your students' families according to the following list of categories:

- Large van or light truck
- Mid-sized sedan or station wagon
- Compact car
- No vehicle owned: family relies on public transit

The Pembina Institute's *Climate Change Awareness and Action Kit* contains an excellent research activity on transportation that allows students to evaluate the environmental and financial costs of vehicle ownership. See page 221 of the CCAA Teacher Plan.

## Getting There From Here: Investigating Community Transportation Issues

### Student Worksheet

#### Introduction and background:

In many urban areas, automobiles are a serious problem. Especially in downtown areas where parking is limited, streets may be crowded with vehicles and therefore dangerous. In addition, pollution from automobiles is known to be a significant health concern. Many cities have developed plans to encourage other forms of transportation to and from the downtown core, providing incentives for people who work downtown to leave their cars at home.

In this activity, you will examine ways to reduce automobile traffic in the downtown area of your town or city. You will provide your city's mayor and municipal council with ideas for encouraging alternative transportation. You will be developing a report and possibly a presentation that could be given to your local mayor that will describe in detail two forms of alternative transportation.

#### Instructions

You have been assigned to a group, and have been given a community in or near your city as a starting point for your research. With the members of your group, you will examine ways to encourage cycling and the use of city buses or the subway to get people from your assigned community to the downtown core, thus reducing the use of vehicles. You will be provided with a map of your town or city to help you.

#### Cycling

##### 1. Map and Description of Route

Examine the map provided by your teacher. Find a route that would keep a cyclist safe, yet provide the shortest possible route to the downtown core. Be prepared to communicate this route to your classmates. Determine if the existing paths and roads would provide a reasonably safe and attractive route for a large number of cyclists.

##### 2. Viability of Commuting by Bicycle

Is cycling to and from downtown realistic for residents living in this area? Based on the distance and route between your assigned community and the downtown core, write an assessment of the best possible cycling route, its safety, and whether it will be viable for large numbers of commuters. Consider the seasonal conditions experienced by your city as you discuss this.

##### 3. Encouraging Greater Use of Bicycles

What changes could be made to encourage greater use of bicycles between your assigned location and the downtown core? Be specific. Describe changes to roadways, traffic lights, and other parts of the transportation system that would permit greater numbers of bicycles to be ridden to the downtown area. For instance, there may be dangerous freeway crossings that could be avoided by installing an overhead pedestrian/cyclist bridge. List several recommendations for improving the accessibility of the downtown area by cyclists, and be prepared to present your recommendations as part of your report.

## Public Transit

### 1. Viability of Commuting by Public Transit

Your community may or may not have public transit (buses, subway). If it does not, do you think there is a need for public transit? Describe the type of public transit that might be needed.

### 2. Map and Description of Public Transit Routes

Examine the map provided by your teacher. Describe the main routes that are (or could be) used by a public transit system to get people from your assigned community to the downtown area.

### 3. Encouraging Greater Use of Public Transit

List several ways your city mayor and council could encourage greater use of public transit and outline your recommendations. Think about the needs of people who do not own vehicles, but regularly need to get from one part of town to another.

## Private Vehicles

Private vehicles are generally a problem in major urban centres. Many cities are developing plans for their downtown areas that limit the use of vehicles in certain areas in order to relieve traffic congestion, improve safety and air quality, and make room for pedestrians. With the help of your map, try to

- pinpoint high traffic areas and intersections in the downtown area
- identify parts of the downtown area that could be converted to vehicle-free pedestrian plazas
- provide a list of recommendations to encourage drivers to leave their vehicles at home

## Report and Presentation

Summarize your findings for cycling, public transit, and private vehicles in a maximum three-page written report. Additionally include copies of any maps that can help you describe the routes and changes you highlight in your report.

If asked by your teacher, prepare a short (10- to 12-minute) oral report that you can present to the class. You may wish to take advantage of your school's computers and other equipment to create a PowerPoint presentation for your classmates.

