

# New Brunswick

CANADIAN GEOGRAPHY 120

PORTRAITS OF THE NATION



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CANADIAN GEOGRAPHY 120:  
PORTRAITS OF THE NATION

**June, 1953..... Hilary and Tensing find  
fossil fish near the summit of Mt. Everest.**

The geologist would attempt to describe the age of these fossils. The biologist would attempt to describe their place in the process of evolution. The surveyor would be concerned with changes in their location. The chemist would determine the composition of the rock. The physicist would be concerned with the forces which raised the fish to new found heights. Only the geographer is concerned with all of the above and anything else which might help to explain how these fossils fit into a global pattern.

Geography's concern is space. Geography uses a spatial perspective to study the arrangement and interaction of people and places over Earth's space. By understanding and using a spatial perspective, students seek answers to the questions: What is it? Where is it? Why is it there? What is the significance of its location?

Geography teaches students to organize their thinking with a view that encompasses the spatial analysis of the properties of Earth's surface. It concentrates on the ideas of distance and connections; and views the physical and human elements on Earth's surface as interacting systems that connect the human experience with the natural environment.

Geography presents a framework for addressing local, regional, national, and global questions. Through geographic enquiry, which fosters critical thinking skills, analysis and synthesis, students learn that the spatial distribution and arrangements of living organisms, places, and events are critical elements in a comprehensive knowledge of their world.<sup>1</sup>

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<sup>1</sup> Council of Chief State School Officers et. al., Geography Assessment Framework for the 1994 National Assessment of Educational Progress (National Assessment Governing Board, U.S. Department of Education, pre-publication draft), p.10.

## RATIONALE

Geography is the study of humanity and the relationship it has with its natural environment in all its diverse aspects. A Canadian geography course should therefore, be centered on the study of the ever changing cultural and physical landscapes of Canada and how they impact on each other. The nature of this relationship may be realized with the adoption of an ecosystem approach - an examination of physical systems; and an interrelating of these with man-made structures and systems. Canadian geography should be involved with environmental issues which are currently pertinent to the lives of Canadians. It is recognized that the geographic concepts of place and location are fundamental. At each stage it is essential to consider where things are, why they are there, and the significance of these with respect to future patterns.

## LEARNING OUTCOMES

While specific objectives will be emphasized in particular units, it is important to integrate these understandings and skills throughout the course. For example, while a consideration of topography is undertaken initially when dealing with landforms in unit 2, The Physical Basis of Canadian Geography, topography is an important consideration when discussing resources, settlement, and communication patterns.

### Cognitive Objectives

Students will be able to describe and explain:

1. Canada's position in the world.
2. the evolution of the Canadian landscape and resource base.
3. Canadian weather and climate patterns.
4. Canadian soil and vegetation patterns.
5. Canada's changing demography.
6. the evolution of Canada's settlement patterns.
7. the origin, growth and structure of Canadian urban centers.
8. the pattern of primary, secondary and tertiary industries and their impact on the Canadian environment and economy.
9. Canada's transportation and communication networks.
10. significant regional differences in Canada.
11. and utilize a wide range of geographic information and skills to project a vision of Canada in the future.

## Skills Objectives

Students will be able to:

1. interpret topographic maps - scale, grids, elevation symbols, profiling, direction, area (for density calculations).
2. interpret oblique, vertical, stereo and satellite photographs.
3. use statistical information.
4. construct and interpret graphs, charts and tables to display geographic information in diagrammatic form.
5. determine the accuracy and validity of information and detect bias.
6. understand the effects of map projections on displaying distributions.
7. use statistical techniques to understand and interpret statistical data.
8. synthesize information in a reasoned written response supplemented by maps, diagrams, graphs, statistics and sketches.

## COURSE OVERVIEW AND UNIT STRUCTURE

1. Canada's Location, Boundaries and Dimensions
2. The Physical Basis of Canadian Geography
  - a. evolution of the Canadian landscape through geologic time
  - b. landform processes
  - c. evolution of physical regions
  - d. weather, climate and climate regions
  - e. soils, vegetation and agricultural potential
3. Settling the Land
  - a. growth and composition of the Canadian population
  - b. distribution of the Canadian population
  - c. rural settlement patterns
  - d. origins of towns and cities
    - i. site and situation
    - ii. land conflicts in the rural-urban fringe
  - e. the evolution and structure of a selected Canadian city: an urban case study
  - f. the rise and fall of single industry towns
4. Managing Natural Resources
  - a. agriculture
  - b. fishing
  - c. forestry
  - d. mining
  - e. energy
  - f. water
5. Secondary, Tertiary and Quaternary Industries
  - a. factors in industrial location
  - b. selected case studies in Canadian industry
6. Continental and Global Linkages
  - a. Canada in the Continental Economy
  - b. Canada and the World: Trade, Aid and Travel
7. A Geographic Perspective on a Current Canadian Issue

## SUGGESTED TEACHING TIMES

While all units in the suggested sequence are important to an understanding of the geography of Canada, individual teachers may elect to make adjustments appropriate to their situation.

<u>Unit</u>	<u>Class Periods</u>
1. ....	5
2. ....	20
3. ....	15
4. ....	7
5. ....	20
6. ....	5
7. ....	8
	<hr/>
	TOTAL 80

## COURSE ORGANIZATION - KEY QUESTIONS

While the course outline contained in this document is organized in traditional, content defined units, it should be noted that the units also introduce students to various types of geographical studies.

Map and graph skills are found in all units as they are related to all fields of geography but the units also introduce students to a variety of ways of studying both physical and human geography. Unit 1 has an emphasis on these skills and uses them to define Canada's location. In examining Canada's boundaries, it is also necessary to introduce the effects of political decisions. Unit 2 samples physical geography including geology, climatology, meteorology and ecology. Unit 3 introduces demography, historical and settlement geography including rural settlement and urban studies. Units 4 and 5 examine economic geography and introduce the idea that geographic factors influence the distribution of economic activity. Unit 4 adds an environmental and policy component when considering the idea of resource exploitation versus sustainable development. Unit 6 moves the course into the realm of geopolitics as it examines Canada's links with the rest of the world. The final unit may have as its focus any of the above areas and should provide an opportunity for synthesis of skills and concepts acquired throughout the course.

This course not only surveys Canada but also introduces students to the scope and purpose of the discipline of geography. Each unit may be used to illustrate a different aspect of geographical study, e.g physical, historical, economic. This provides alternative ways to understand and make sense of the course material. It may also serve to show students the extent and variety of geographical studies.

It is recommended that the course be taught by investigating a series of basic questions. This method is similar to the issues approach used in many other social studies programs. The use of questions, however basic, necessitates the search for answers and thus focuses student attention. For this reason, teachers should use the approach, which is elaborated upon below.

Unit 1 is intended not only as an introduction to Canada's boundaries and location but as an opportunity to review basic map skills. It could easily be organized around the question,

### Where is Canada?

This question sounds simplistic but is useful in engaging students at the outset of the course. They may believe the answer is obvious but its simplicity hides many layers of meaning. This question can be used to look at Canada's location as described by latitude and longitude, distance from other centers, physical boundaries and situation in the world. The discussion of all of these requires the use of atlases and maps and an overview of the map skills needed to interpret such materials.



The complexity of Unit 2 requires a series of questions be used to organize investigations into Canada's physical geography:

### Physiography

- How did the Canadian landmass come into existence?
- How was the landmass, once created, shaped?
- What is the nature of the landscape which resulted?
- What resources were created in the process?
- Why is this of significance to Canada's development?

### Climate

- What are the characteristics of the various climates of Canada?
- Why do Canada's climates differ?
- What effects does this have on the lifestyle of Canadians?

### Natural Vegetation and Soils

- What natural vegetation and soils exist in Canada?
- Where are they found? Why there?
- How have geology, topography and climate influenced the nature and distribution of the natural vegetation and soils of Canada?
- What effect has the nature and distribution of natural vegetation and soils?

Unit 3 begins to study human interaction with the landscape described in earlier units. It focuses on the composition and distribution of Canada's population and, using a chronological approach, examines the way in which Canadians have adapted their settlements to the resource base described in Unit 2.

Questions which might be used for this unit include:

- Who settled Canada?
- Why did they come here?
- Where did they settle? Why there?
- How did Canada's settlers divide up the land? Why?
- Why are the patterns different from place to place?
- Why did urban settlements begin to grow in early, rural Canada?
- Why have cities and towns developed in their particular locations?
- What effect has the growth of urban centers had on the Canadian environment?

Unit 4 studies the primary economy and examines the ways in which Canadians make a living. Natural resources were the basis of the first economic activities in Canada and continue to play an important part in economic development. It would be natural to examine this topic by asking:

What are Canada's natural resources?  
Where are they found? Why there?

These questions provide an opportunity to make the link to Unit 2 which is necessary to illustrate the influence of physical geography on Canada and Canadians. The study should continue by asking:

What resource industries have developed in Canada? Where? Why there?  
Why have some of Canada's resources not been developed?

Finally, the effects of resource exploitation as opposed to management should be considered:

What has been the effect of Canadian resource exploitation?  
What role should resource management play in the primary industries?  
Is sustainable development a realistic and desirable goal?

It is logical to proceed from a consideration of resources to a study of secondary industries. Tertiary and quaternary industries are also included in Unit 5 because they depend on the secondary economy. Students might consider:

What manufacturing industries does Canada have?  
Where are they located? Why there?  
What effect has this on the changing distribution of population and wealth?  
How does it affect the distribution of economic and political power?  
What industries exist to service primary and secondary industry? Where are they located? Why there?  
Why are tertiary and quaternary industries becoming more important in Canada?

Unit 6 sets the nation in a continental and global context. This is an extended study of Canada's situation with respect to the rest of the world. It includes all types of links between Canada and the global community. Questions which might be asked include:

With whom does Canada trade? Why those nations?  
How important is this to Canada?  
What is Canada's role in the global community?  
Why do we play this role? Do we do enough?

The final unit is intended to provide an opportunity for students to apply the skills acquired in the course to the analysis of current geographical issues. As a consequence, its specific content may vary from year to year. In 1992, an investigation might center on the following questions:

- What might be the impact of railway closures in the Maritimes?
- What could be the effect of NAFTA on the Canadian economy?
- What might be the impact of global warming on agriculture in the Prairie region?

It is not intended that the questions mentioned in relation to each unit be the only ones which might be asked. It is suggested, however, that this kind of organization might clarify the purpose of each unit to the student and provide the basis of an investigative, discovery based style of instruction in the course.

How will this approach make for more effective classroom instruction? Well framed questions will provide a clear task for students and help to channel their efforts in analyzing material, synthesizing information and formulating responses. This teaching technique clearly places the student in a problem solving situation.

## GENERAL TEACHING APPROACHES

The teacher of geography should strive to use a variety of teaching techniques in presenting each topic. The individual lesson should involve students in a variety of learning activities, thereby accommodating a number of learning styles. The teacher should be limited only by his/her imagination.

Some examples of techniques that geography teachers can use are:

### 1. Field Work and Local Studies

This may be as simple as going outside to observe shadows, cloud formations, soil profiles, or traffic flows. Students should be encouraged to gather data in the field for later analysis. Ideas for local studies are contained in the teacher's guide to Leonard A. Swatridge and Ian A. Wright, eds., Canada: Exploring New Directions, Markham: Fitzhenry & Whiteside, 1993. Pages 148 to 159 contain a useful section on developing local studies.

### 2. Visual Methods

Geography particularly lends itself to the use of visual techniques of analysis. Whenever possible students should be involved in constructing, analyzing and commenting upon flow charts, graphs, field sketches, and annotated diagrams (based on life or on the printed word). Slides, photos and film are also excellent resources from which students can describe and analyze landscapes, patterns and distributions.

### 3. Mapping

Maps of all types should be used whenever possible in the geography classroom. These should include atlas, topographic, weather and statistical maps.

### 4. Statistical Analysis

Students may use statistics, which are precise and current expressions of information, to examine patterns, trends, and correlations. In this area it is recommended that teachers make use of the teacher's guide to John Molyneux and Marilyn MacKenzie, Vistas Canada, Scarborough: Prentice-Hall Canada, 1991<sup>2</sup>.

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<sup>2</sup> Vistas Canada presents very detailed information and challenging activities. It is an excellent teacher reference and source of enrichment materials.

## GENERAL EVALUATION STRATEGIES

A wide variety of learning methodologies are recommended and this necessitates a variety of evaluation methods. Students can be marked on written material, map making, graphing and general illustrative techniques. Although the highest order of achievement may be the production of a synthesis or general overview, such a synthesis could be expressed in a written, visual or even a video form. This provides an opportunity to encourage response from students with different learning styles.

There are many hands-on activities suggested in this course. The evaluation of such activities can be broken down into several sections; for example, in producing a series of graphs based on a set of statistics:

- (a) how accurately has the student translated the material from a written to a visual format?
- (b) how visually pleasing is the end result?
- (c) how has the student demonstrated that he/she now has a grasp of the concepts being illustrated?

The final mark for the project should be a composite of such sub-sectional marks.

When tests are being designed it is important in geography, as in all subjects, to evaluate a variety of skills, e.g. ability to recognize, recall, organize, analyze, synthesize, evaluate and apply a variety of information. In geography however, it is especially important to emphasize the visual and spatial aspects of study. To this end, tests should usually include questions which are based on maps, diagrams and/or graphs. The activities and exercises referred to in this curriculum guide should be used as models to develop questions which test a variety of levels of learning.

It is important that evaluation should do more than just cover the information and skills learned in class. One of the major aims of the course is that students should learn to apply the skills and concepts they have acquired to new situations. Students should therefore be evaluated on their ability to solve problems.

## DETAILED UNIT PLANS

### Unit 1: Canada's Location, Boundaries and Dimensions

Students should develop mental maps of Canada and an awareness of Canada's position with respect to the rest of the world.

#### Objectives

Students will be able to:

1. use scale to determine the size of Canada.
2. calculate the area of Canada from a base map.
3. read latitude and longitude to describe Canada's position in the world.
4. describe the geographic basis of Canada's boundaries.
5. use an atlas to locate places in Canada.
6. describe Canada's location with respect to other nations.

#### Teaching Approaches

This introductory unit provides an ideal opportunity to engage in student-centered, activity based learning and thus set the tone for the entire course. It is suggested that the teacher make extensive use of Walter G. Kemball, Geographic Understandings, Toronto: Oxford University Press, 1990 and Geoffrey J. Matthews and Robert Morrow, Jr., Canada and the World: An Atlas Resource, Scarborough: Prentice-Hall Canada, 1985 and 1994 to supplement and extend the material in the basic text. Students who have taken previous geography courses may already have some of the skills taught in this unit. This unit of study provides an excellent opportunity to utilize these students as peer tutors and to encourage cooperative learning.

The unit objectives could be accomplished with a few exercises designed to involve the students in a variety of practical activities to teach them some basic geographical skills. These could include:

1. use of map scale to calculate Canada's dimensions. See Geographic Understandings, pp. 16-17.
2. calculation of area using a base map of Canada and one of the methods shown on Geographic Understandings, p. 19. Answers should be compared to the figures given in the text and available atlases as well as to other student answers. The reasons for the differences should be discussed and explained with reference to the method of calculation. (Reference may be made at this point to the significance of the projection of the base map. See Geographic Understandings, p. 196 on map projections and distortions.)

An extension of this may be to have students determine the area of Canada including the 320 km. wide zone of economic control. (See maps on p. 344-345 of Vistas Canada.) Students should have to add this to the base map using scale and a limited number of control points to give an approximation of the boundary. Students then could consider interesting issues which arise from the exercise: Does Canada control all of the waters of Hudson Bay? Does Canada control all offshore oil and fish resources? (Refer to p.80 of C.L. Blair, E.E.D. Day and B.R. Frid, eds., The Canadian Landscape: Map and Air Photo Interpretation, 3rd ed. Toronto: Copp Clark Pitman, 1990 on the Georges Bank boundary dispute.)

3. the study of Canadian boundaries during which students would, on an outline base map:
  - (a) name the extremities and give their latitude and longitude,
  - (b) mark and name natural features which are used as national and international political boundaries,
  - (c) mark and name man-made features, e.g. latitude and longitude lines, which are used as national and international political boundaries, and
  - (d) and discuss the advantages and disadvantages of using such features for marking boundaries.
4. the creation and use of symbols, developed on the basis of statistical data such as that shown on page 16 of Canada: Exploring New Directions to show the locations of major Canadian features. If possible, current data from Statistics Canada should be used with this exercise. Location and place name geography should not be overemphasized; rather the location of places should be incorporated into the study of every topic so that locational knowledge will receive continuous reinforcement without memorization.
5. the study of great circle routes and their significance for Gander and Iqaluit. See Geographic Understandings, p. 197. Students might also attempt to explain the statement about the distance between Alert and Moscow which is on the map on p. 8 of Canada: Exploring New Directions. The implications of the answer could form the basis of discussion of Canada's defence policies since World War II.

## Resources

Geographic Understandings, p. 105 deals with area calculations. Note, however, that there is an error in scale on page 105. It should read each dot represents 4 km<sup>2</sup> not .4 km<sup>2</sup>.

Pages 1 - 4 of Geographic Understandings deal with latitude and longitude.

## Audio-Visual Materials<sup>3</sup>

TITLE	Md	Yr	Aud	Mn	Dstr	Code
Contour Connection, The	VHVB	83	H	28	NFB	700646

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<sup>3</sup> Audio-visual resources, where possible, are listed using the standard Instructional Resources format. This includes the title, type of media, year of production, intended audience, length in minutes, distributor and Instructional Resources ordering code.



## Unit 2: The Physical Basis of Canadian Geography

Students should acquire an understanding of processes which have produced, and continually bring about, changes in the Canadian physical environment. This will involve a study of the forces which produce the wide variations in landscape, climate, weather, vegetation, and soils within our vast country.

### Objectives

Students will be able to:

1. identify the three main rock types and explain their creation.
2. describe and explain the major forces in landform creation with particular reference to: plate tectonics, folding, faulting, vulcanism and the Pleistocene glaciation.
3. identify, locate and describe Canada's physiographic regions and explain their origins.
4. use topographic maps and photographs to identify examples of specific landforms.
5. interpret a simple weather map.
6. draw and interpret a climograph.
7. interpret isoline maps.
8. calculate temperature ranges.
9. identify and explain the major controls on Canada's weather and climate.
10. describe and recognize the climatic characteristics of various regions of Canada.
11. locate and describe Canadian soil and vegetation regions.
12. explain the interrelationships among parent material, topography, climate, vegetation regions, and soil.

### Teaching Approaches

Unit 2 provides an excellent opportunity to continue student centered, activity based learning. The discussion of geology required should be accompanied by the examination of rock samples, identification and classification of their characteristics, and an explanation of their origin and usefulness. The study of physiographic regions permits the introduction of topographic maps through sample studies of representative landscapes. Extensive use of visual materials is recommended here to help students develop accurate images of the Canadian landscape. Climate studies lead naturally to field observations of weather and the tabulation of collected data, the drawing of climographs, and the analysis of isoline maps. Soil studies might be accompanied by examination of a soil profile in the school yard. Correlations between all of these physical factors might be examined using an atlas study in which their locations were all added to a single base map.

A selection of activities which might be found useful in this unit can be located in the following:

1. Robert Morrow, Jr. and Don Revell, Canada and the World: An Atlas Resource. Teacher's Guide. Scarborough: Prentice-Hall, 1987, p. 99 - 113.
2. C. L. Blair and R.I. Simpson, The Canadian Landscape: Map and Air Photo Interpretation. Toronto: Copp Clark, 1978 and C.L. Blair, E.E.D. Day and B.R. Frid, eds., The Canadian Landscape (1990 edition) both provide an index of exercises illustrating particular physical features and their effects. See the back page or pp. 16-18 respectively and select appropriate activities.
3. Also see the appendix for sample lesson plans.

None of the exercises are meant to be isolated examples. All teaching plans should strive to show the interrelationship of the natural controls and how they have combined to produce Canadian landscapes and climates. It is expected that exercises in these areas will set the stage on which will follow the interplay of human activities. The environment which has been described and explained is, after all, the resource base with which Canadians have had to work.

### Resources

Topographic maps of the local area

C.L. Blair, E.E.D. Day and B.R. Frid, eds., The Canadian Landscape, both 2nd and 3rd editions. See listings on the back page and on pages 16 - 18 respectively.

Emile D. Chevrier and D.F.W. Aitkens. Topographic Map and Air Photo Interpretation. Toronto: Macmillan, 1970.

David Phillips. The Climates of Canada. Ottawa: Minister of Supply and Services, 1990.

W. Derry and C. Nash. Geolab3. Toronto: McGraw-Hill Ryerson Limited, 1987.

F. Kenneth Hare and Morley K. Thomas. Climate Canada. Toronto: Wiley, 1974.

D.Q. Innis. Canada: A Geographic Study. Toronto: McGraw-Hill, 1966. See particularly the section on soil profiles.

R. Spencer Inch and W.G. Stone. The Physical Environment. 2nd ed. Toronto: McGraw-Hill Ryerson, 1982. See particularly the chapters on climate and weather.

J.I. MacDougall, C. Veer and F. Wilson. Soils of Prince Edward Island: Preliminary Report of the Soil Survey of Prince Edward Island. LRRRI Contribution Number 141. Ottawa: Minister of Supply and Services Canada, 1991. This publication is available from J.I. MacDougall, Research Station, Research Branch, Agriculture Canada, Box 1210, Charlottetown, P.E.I. C1A 7M8.

J. Brian Bird. The Natural Landscapes of Canada. 2nd ed. Toronto: John Wiley and Sons, 1980.

Environment Canada Atlantic Region. East Coast Marine Weather Manual. Ottawa: Ministry of Supply and Services, 1989. (rev. 1990)

P.A. Dzikowski, G. Kirby, G. Read and W.G. Richards, The Climate for Agriculture in Atlantic Canada, Publication Number ACA 84-2-500, Agdex Number 070. Atlantic Advisory Committee on Agrometeorology. March 1984. This rather specialized report has excellent climate maps of the Atlantic region presented in blackline master format.

Audio-Visual Materials

TITLE	Md	Yr	Aud	Mn	Dstr	Code
Geosciences: Careers for Women	VH	84	JHA	29	KINET	703270
Earth Science		85	HUAT		OD	SOO259
Earth Science		77	HUA		NSDE	S00067
Earth Science: Atmosphere	VHVB	77	JHU	15	NSD	700110
Earth Science: Geology and Meteorology	LV	85	HUAT		OD	460016
Earth Science: The Changing Earth	VHVB	77	JHU	15	NSDE	700108
Earth Science: Water	VHVB	77	JHU	15	NSDE	700111
Earth Scientists (Fr.710767)	VHB	85	HA	18	EMRC	701517
Planet Earth Series	VHS,BETA	88	JH		MAGIC	500416
Science of Change, The	VHVB	90	H	11	EMRC	702511
See What Earth Science Is All About	VB	85	T		VP	700804
Five Billion Years	VHVB	81	EJH	7	NFB	7000982
Acid Rain: Requiem or Recovery	VHVB	81	HUA	27	NFB	700644
Northern Forests, The	VB	84	HUA	55	BBC	700717
Earthquakes in Canada (Fr. 71077)	VHVB	87	JH	15	EMRC	701514
Land Above the Trees	VHVB	88	JH	20	NFB	702110

Audio Visual Materials (continued)

Geological Survey of Canada (Fr.)	VHVB	91	HUA	5	EMRC	703321
In One Day (Fr. 210796)	16mm Film	67	EJHA	18	NFB	202927
Canada's Pacific Provinces and Northland	VHVB	80	JH	13	CORON	701167
Climate Puzzle: Climate - Past, Present, Future	VHVB	88	JH	29	MAGIC	702925
Climate Puzzle: The Atmosphere	VHVB	88	JH	29	MAGIC	702924
Science of Change, The	VHVB	90	H	11	EMRC	702511
Climates of North America	16mm Film	62	EJHA	17	NFB	201827
Above the Horizon	16 mm Film	62	EJHA	21	NFB	202265
Origins of Weather	16 mm Film	65	EJH	13	NFB	701293
Origins of Weather, The	16 mm Film	63	EJH	13	NFB	201899
Storms: Restless Atmosphere	VH	74	JHU	22	BL	702633
Trouble in the Forest (Suzuki on Acid Rain)	VHVB	78	JHUA	47	NFB	702863
What Makes Rain? (Revised)	16 mm Film	75	HU	22	EFB	203400
Erosion & Weathering: Looking at the Land	VHVB	76	J	17	VEC	701241
Erosion & Weathering: Looking at the Land	16 mm Film	76	J	17	VEC	203386
Air and Wind	VHVB	82	E	15	KINET	702091
Earth: Fragile Soil, The	VH	88	HUA	20	THA	702650

Audio Visual Materials (continued)

Soil: An Introduction	16 mm Film	76	PEJ	8	BFA	102245
Understanding Our Earth: Soil	16 mm Film	77	EJH	12	CORON	102252
Common Ground	VHVB	87	HA	20	NSDE	701541
Prairie Grasslands	VH	91	JH	28	MAGIC	703255

### Field Work and Local Studies Ideas

1. Examine local rock outcrops and drift deposits (Road cuttings often provide a good site for examining these.), relate these to the local topography and correlate them with topographic and geologic maps.
2. As the opportunity presents itself, observe and discuss local weather phenomena. Correlate observations with local weather maps which are often available in the newspaper.
3. Take soil samples from various landscape settings, examine and account for the profile, texture and acidity of each.

See also pages 153-154 of Canada: Exploring New Directions. Teacher's Guide, Markham: Fitzhenry & Whiteside.

### Unit 3: Settling the Land

Students should develop an appreciation of the man-made patterns on the Canadian landscape through an understanding of the salient physical and cultural influences. This will be achieved by studies of the physical, historical, cultural and economic factors which have produced (a) Canada's present population distribution; (b) Canada's varying rural landscapes and (c) created the country's major population clusters. This should enable students to assess the impact of current policies and social trends on Canada's future settlement patterns.

#### Objectives

Students will be able to:

1. describe and explain the pattern of Canada's population growth.
2. describe and explain the ethnic composition of the Canadian population and regional variations therein.
3. describe and explain the distribution of Canada's population
4. discuss the implications of Canada's immigration policy on future population patterns.
5. describe and account for Canadian rural settlement patterns and their subsequent development.
6. evaluate the relative advantages and disadvantages of the various rural settlement patterns.
7. explain the comparative advantages and disadvantages of site and situation for the establishment and growth of cities.
8. illustrate the causes of urban growth by reference to at least one major Canadian city.
9. describe and explain the factors involved in the rise and fall of single industry towns.
10. explain and evaluate the impact of urban growth on surrounding rural areas.

#### Teaching Approaches

Having studied the resource base, students should now be ready to analyze the interplay of human history and the natural environment. For the first time in this course, people and their associated economic and cultural activities will become the major focus of study.

The teacher should avoid the pitfall of implying that physical conditions cause a particular human response, i.e. determinism. It must be realized that choice is influenced by the value system of a society, its technology, and organization, i.e. possibilism. Thus the response to a particular environment may vary with ethnic origin and time.



In lesson planning the teacher is advised to follow the second of the following procedures (right side of chart):

A. Observation or Examination  
of Data

Recording

Classification and Analysis

Description and Explanation

B. Ideas from Discussion or Reading

Observation and Recording

Problem

Hypothesis

Collect and Record Data

Test Hyposthesis

If True

Attempt Further  
Hypothesis and  
Generalization

If False

To New  
Hypothesis

There are several excellent sources of ideas and activities which should be consulted. These include:

1. Canada and the World: An Atlas Resource. Teacher's Guide., pp. 82-97 with particular emphasis on sections 9/10 and 11/12.
2. Dynamic Canada, chapter 8 contains student activities making use of classroom generated population statistics which might then be compared with provincial and national data. A variety of other activities, and the supporting data to complete them, may also prove of interest.
3. Vistas Canada, pp. 28-101 and the accompanying guide provide numerous ideas and exercises. Many are quite advanced and would be useful for enrichment activities.
4. The Canadian Landscape, all editions, and Chevrier and Aitkens, Topographic Map and Air Photo Interpretation provide a variety of map exercises illustrating settlement patterns from across Canada.
5. Graham Draper et. al., Canada: Land of Diversity, Toronto: Irwin, 1990, Chapter 12, Urban Patterns and Growth, pp. 157-166 provides a simple model to illustrate the processes of urban growth and development. Teachers could use this as a model to help prepare a local study of their own community. Students could be engaged in primary research in this process. A series of simple maps showing the development of the community could be developed. Activity 15 on pp. 186-187 might also prove useful.
6. Also see the appendix for sample lesson plans and activities.

### Resources

Canada: Exploring New Directions. Note particularly the studies of the ports of Vancouver and Montreal on pages 315 - 319 of Chapter 6, Transport and Communication.

Audio-Visual Materials

TITLE	Md	Yr	Aud	Mn	Dstr	Code
First Nations, The (9,000-500 B.C.)	VHVB	86	JH	30	TVONT	701642

Field Work and Local Studies Ideas

See pages 154-156 of Canada: Exploring New Directions. Teacher's Guide.

## UNIT 4: MANAGING NATURAL RESOURCES

Students will be made aware of the nature of Canada's natural resources and will evaluate the physical, economic and political factors which have influenced their location, development and utilization. Consideration should also be given to the future of these resources in the context of resource management and environmental protection initiatives.

### Objectives

Students will be able to:

1. identify, locate and describe the distribution of Canada's primary industries.
2. describe and explain past and current trends in the development of the resource industries.
3. explain the factors which influence the distribution of primary industries.
4. describe and explain the difference between renewable and non-renewable resources.
5. demonstrate an understanding of the concept of sustainable development.
6. illustrate these concepts with specific Canadian examples and case studies.
7. appreciate the economic and political significance of Canada's water resources in a continental context.

### Teaching Approaches

In the planning of instruction for this unit, it is not intended that teachers deal with all industries; rather a selection of in-depth studies should be undertaken. Alternately, teachers might adopt a seminar approach using the jigsaw technique. This would involve students in research and reporting in a cooperative group environment. Each would gain an in-depth knowledge of one industry and, from the reports of their peers, an acquaintance with several others.

It is imperative to maintain focus in planning instruction for this unit. Do not neglect the essential geographic question "why here?". Reference to earlier studies of the physical geography of Canada will review and reinforce previous learning as well as supplying much of the explanation of the distribution of Canada's natural resources. Analysis of the location of resource industries will also serve as an advance organizer for studies of industrial location theory which is presented in the next unit.

Any investigation of resource industries should also include consideration of transportation factors which can be studied from the appropriate chapters of the text, e.g. the effects of the railway on prairie wheat farming.

As in the previous unit, there are several excellent sources of ideas and activities which should be consulted. These include:

1. Canada and the World: An Atlas Resource. Teacher's Guide., p. 114-141 and 150-158.
2. Vistas Canada, pp. 160-167 (fishing), 168-174 (forestry) 174-184 (agriculture) 184-193 (water) and 193-211 (mining).
3. See the appendix for sample lessons and activities.

In addition, a discussion of the multiple, often conflicting, uses of the local water supply would help to focus students on the importance of water supplies.

### Resources

See chapter 6 of Vistas Canada.

Audio-Visual Materials

TITLE	Md	Yr	Aud	Mn	Dstr	Code
Geoscience Mapping	VHVB	91	HUA	5	EMRC	703321
Agriculture Canada	VHVB	70	EJ	26	NFB	700738
Agriculture Canada	16 mm	70	EJ	26	NFB	203570
Agriculture is Everybody's Business	VHVB	87	H	19	NSDE	701385
Commitment to Action (N.B.Forest Industries)	VHVB	84	HUA	28	NBDE	700539
Forestry: Coming of Age	VHVB		JHA	19	NBDE	702317
Let's Make A Deal (Atlantic Fisheries Crisis anticipated)	VHVB		HUA	90	TVONT	702536
Men and the Forests, The	VHVB	84	JHA	30	CBC	700486
Merv's Tree Farm	VH	91	JH	28	MAGIC	703257
More Than Just the Trees	16 mm Film	78	HA	28	NFB	203339
More Than Just the Trees	VHVB	78	HA	28	NFB	700747
Paper Chronicles	VHVB		JHA	22	NBDE	702318
Pelts: Politics of the Fur Trade See, Hear! (Canada: James Bay, BC)	VHVB	79	JH	27	TVONT	700355
Agriculture	16 mm Film	87	F		LBA	510240
Agriculture in New Brunswick	VHVB	83	HUA	10	NBDA	701459
Fragile Harvest	VHVB	86	JHUA	49	NFB	702874

Minimum Tillage Agriculture	VHVB	84	HUA	30	NBDA	701420
Apple Farming in New Brunswick	VHVB	84	HUA	30	NBDA	701419
Farming with a Future	VHVB	82	H	30	NSDE	700880
Newfoundland: You Can't Buy Freedom (economic changes)	VHVB			20	NBDE	700091
Where Our Food Comes From	VH	91	JH	28	MAGIC	703259
Mining Million Dollar View, A (Cape Spenser,N.B.)	VHVB	88	HUA	30	CBC	701690
Mineral Vignettes (Fr.710842)	VHVB	87	H	30	EMRC	701585
Forestry Changing Forest	VHVB	85	HUA	30	CBC	701424
In Partnership with Nature	VHVB	90	EJHU	9		702325
Nature of Things: Voices in the Forest	VH	91	H	95	CBC	702839
River Landforms and Catchment Management	VH	87	JH	23	C-VID	702201
Carmanah	VH	91	JH	28	MAGIC	703256
Forests and Co-operation	VHVB	91	J	33	NBDE	702990
Heartland	VH	91	JHU	24	FILMW	703305
Energy in Canada (Fr.711047)	VHVB	90	JHA	18	EMRC	702036
Energy in Canada's Remote Communities	VHVB	89	H	13	EMRC	702037
Fish or Cut Bait	VHVB	89	H	44	FCBC	701913

Fishing in Newfoundland	VH	91	JH	28	MAGIC	703249
Fox Ranching	VHVB	80	HUA	16	NBDA	701934
Choose Agriculture (Fr. 710772)	VHVB	87	H	10	AMW	701519
Reflections on a Prairie Slough	VHVB	91	PEJH	28	DUCKS	703145

Field Work and Local Studies Ideas

See page 157 of Canada: Exploring New Directions. Teacher's Guide.



## UNIT 5: SECONDARY, TERTIARY AND QUATERNARY INDUSTRIES

Students will understand the locational forces which have brought about the present patterns of industrial development and those which might influence future distributions. Consideration will also be given to the relationships among these patterns and the economic well-being of Canada's regions.

### Objectives

Students will be able to:

1. describe and explain the regional pattern of Canadian industry.
2. explain the location of specific Canadian secondary industries with reference to the major industrial location factors.
3. describe and explain the impact of the communications revolution on some service industries particularly those based on information.
4. describe the causes of the increasing importance of tertiary and quaternary industries in the Canadian economy.

### Teaching Approaches

At the outset of the unit, the overall distribution of Canadian secondary industry can be shown using Activity 7-4, p 222 of Vistas Canada and p. 111 of John Molyneux and Marilyn MacKenzie, Vistas Canada. Teacher's Guide, Scarborough: Prentice-Hall, 1992. (Vistas Canada presents activities which are at a high level of difficulty.) This activity incorporates the plotting of a basic "graded shading" map thus maintaining the activity based approach suggested at the beginning of this guide. Teachers may wish to modify this activity to use colour coding instead of "graded shading" in order to simplify the drawing process. It might also be feasible to reduce the number of categories plotted. (NOTE: The base map referred to in the activity is to be found on pp. 18-19 of the Teacher's Guide not in the location indicated in the activity.)

Activity 7-7 in Vistas Canada and pp. 116-117 of the Teacher's Guide provides a statistical activity which will emphasize to students the disparities of wealth based on manufacturing across Canada and serve as a useful basis for discussion of regional disparities. The activity might easily be extended into a consideration of solutions to the problems of disparities and suggestions for future courses of action for the economically disadvantaged regions.

Unit 5 also provides teachers with the opportunity to develop relevant local studies and to conduct field work. These studies should ascertain how the locational factors discussed in Canada: Exploring New Directions, pp. 255-265 influenced the

establishment and continue to affect the operations of the selected industry. Vistas Canada, pp. 222 and 228 provide examples of local industry locational studies with particular emphasis on the use of statistics.

Any study of industry, whether local or otherwise, should include consideration of the role of transport. In Canada: Exploring New Directions, transport is considered in a separate chapter. This section may be consulted for general information on the role of transport in the Canadian economy, e.g. its influence on the concentration of industrial activity in southern Ontario.

Students should be made aware that the locational factors which influence the establishment of secondary industry do not apply in the same way, if at all, to tertiary and quaternary industries. The provision of services is not bound by the same physical constraints as the production of manufactured goods. However, while the location of primary industries is almost entirely determined by the location of the resource; secondary, tertiary and quaternary industries become progressively less tied to particular locations. Services are required more widely. Information flows easily and cheaply. Consideration should be given to the implications of this for regional economic development.

For an activity based on tertiary industries, the teacher might consider Exercise 3(a), p. 282 of Canada: Exploring New Directions. The data for the entire class relating to demand for services might be displayed in table form. The table could then be used to make comparisons to national patterns. It might be useful to consider why regional differences in demand for services exist.

The local telephone directory will provide much information regarding industries in your area, and may be used as a database. Maps and diagrams may be produced on the basis of distribution and number of industries as represented in the directory. For example, students may be asked to classify by type the local industries listed in the yellow pages. (Each student should only be assigned a few pages to avoid tedium. The results may be shared later in the exercise.) These industries might then be plotted on a base map of the local area using colour coding to differentiate the industrial types. At this point, students would begin to share data by plotting their findings on a new base map then exchanging maps and copying the information collected by others. The resulting map will illustrate the distribution of industries in the local area and can be used as a basis for students to describe and attempt to explain patterns of distribution which emerge. Depending on the nature of the local economy, this exercise might also be used to illustrate the impact of locational factors on any of the industries which are the subject of this unit.

Also see the appendix for sample lessons and activities.

## Resources

Vistas Canada, Chapter 8 is an essential teacher reference for this section.

## Audio-Visual Materials

TITLE	Md	Yr	Aud	Mn	Dstr	Code
Super-Companies	VHVB	87	HUA	57	NFB	702873
Third Wave, The	VHVB	82	JHUA	98	TVONT	701364
Geography and Industry	VH	89	E	25	ASIAS	702177
Beyond Words - Canadian Communications	VHV	84	HU	38	NFB	700814

## Field Work and Local Studies Ideas

See pages 157-158 of Canada: Exploring New Directions. Teacher's Guide.

## UNIT 6: CONTINENTAL AND GLOBAL LINKAGES

Students will assess the significance, to Canadians and the peoples of the world, of Canada's participation in the worldwide net of economic, political and cultural interdependence.

### Objectives

Students will be able to:

1. explain the importance of international trade as a factor in their lifestyle and standard of living.
2. assess the importance of trade to the state of the Canadian economy.
3. describe the pattern of Canada's import and export trade.
4. demonstrate an awareness of international trade agreements and their significance for Canada.
5. describe and evaluate the nature of Canada's contribution to world aid programs.
6. identify the distribution pattern of Canadian aid dollars.

### Teaching Approaches

This unit should not be viewed as a separate entity. Instead, attempts should be made to integrate many of the concepts at a number of points in the course. Indeed, this will already have been done so that portions of this unit serve as review. For example, when tourism is discussed as a tertiary industry, the kinds of links forged among Canada and other nations through international travel will provide a lively method of introducing Canada's transportation and communication links to the rest of the world.

This unit will also provide an opportunity to enhance the students' global awareness. This awareness will become much more immediate if the student deals with concrete examples of linkages as opposed to looking at the issue theoretically.

It is particularly important that any information and/or issues dealt with here be as current as possible. Periodicals are particularly useful for this purpose. Canada and the World, for example, is a monthly publication which often features issues spotlighting Canada's place in the global scene. Maclean's may also prove useful. A class might be asked to count the number of column centimeters of "news" devoted to foreign countries. If each student analyzes 1 or 2 different issues of the magazine, a reasonable sample may be obtained. The data could then be plotted on a world outline map and findings discussed. The strong linkages between Canada and the United States will undoubtedly become obvious from this exercise. The extent of and reasons for this relationship should be analyzed extensively. This would be a

logical point at which to review the nature and effects of the Free Trade Agreement and the North American Free Trade Agreement.

A study which illustrates the connections between the local area and the global community would also be appropriate in this unit. A port study of Saint John, based on information readily available in the "News of the Port" column in the Evening Times-Globe<sup>4</sup>, serves well to drive home the nature of global interdependence. The column can be used to tabulate imports and exports from Saint John. Destinations can be tallied by the frequency with which shiploads move in or out of the port. This information can then be turned into a proportional arrow map showing the type of products (colour code the arrows by product), their origins or destinations (shown by the direction of the arrows), and the relative importance of each (width of the arrows scaled by shipload). The completed map should then become the basis of discussion seeking to explain "why those products?", "why those places?", "of what significance does trade have?", and "why should Canadians be aware of events in the global village?". Such a study would extend the port studies undertaken using the text.

Statistics on many of Canada's global connections may be found in Vistas Canada. Foreign aid and tourism are both covered, for example, and these numbers might form the basis of maps or diagrams illustrating the connections Canada has with the world. The balance of the section is worth consulting as well. Canada and the World: An Atlas Resource with the accompanying Teacher's Guide also include sections on trade, aid and communications which might be utilized.

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<sup>4</sup> The "New of the Port" formerly appeared in the Telegraph-Journal as indicated in the article in the appendix; it is now found sporadically in the Evening Times-Globe.

Resources

Canada and the World: An Atlas Resource

Vistas Canada. See chapters 9 and 10 on trade and aid. Page 333 has a case study of the wheat trade. See page 316 also.

Audio-Visual Materials

TITLE	Md	Yr	Aud	Mn	Dstr	Code
Our Own Voice	VHVB	90	HUA	23	IMAGE	703367
Pollution: World at Risk	VHVB	89	H	25	NATGE	702039
Population Problem, The	VH	90	HUA	19	MARLI	703187

Field Work and Local Studies Ideas

See pages 157-158 of Canada: Exploring New Directions. Teacher's Guide.

## UNIT 7: A GEOGRAPHIC PERSPECTIVE ON A CURRENT CANADIAN ISSUE

Students will apply geographic skills and knowledge in the analysis of a current issue. It is intended that this unit will provide an opportunity for student research and summative reporting.

### Objectives

Students will:

1. identify a geographical issue.
2. develop an hypothesis.
3. select relevant information.
4. test the validity of the hypothesis (as per the model diagrammed in Unit 3) .
5. present the relevant information which has been collected in a variety of formats. This will allow students to demonstrate a mastery of the various geographic skills emphasized throughout the course. While part of the presentation may be a written document, the use of maps, diagrams, statistical charts and other visual materials is essential in such a presentation. Some students may opt for an oral presentation using a multi-media approach.

### Teaching Approaches

Brainstorming may be a useful technique for identifying relevant issues and accomplishing objective 1.

Since current information will be essential, teachers may want to determine if their school library has a vertical file which will provide such information. If not, it might be useful to enlist the students in collecting such information throughout the semester.

### Resources

To help students organize independent study see pages 5-13 of Vistas Canada, Teacher's Guide.

**APPENDIX**  
Sample Lesson Plans and Activities

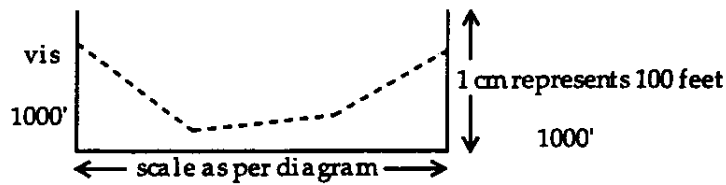


## Plan 1

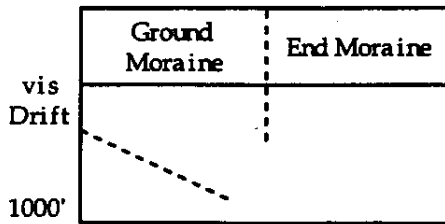
Draw and label a cross section to show the relationships of slope, bedrock, drift, geology, soil and land use.

1. Refer to Page 64, fig. 1. Canadian Landscape - Map and Air Photo Interpretation. Blair and Simpson. 2nd edition.

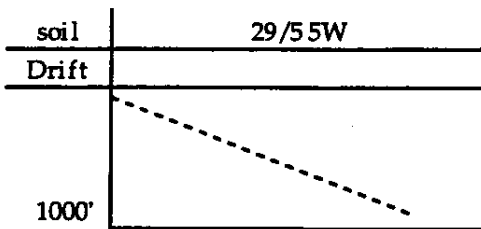
- (a) Plot a profile of the Cretaceous shale bedrock (Southwest to Northeast)



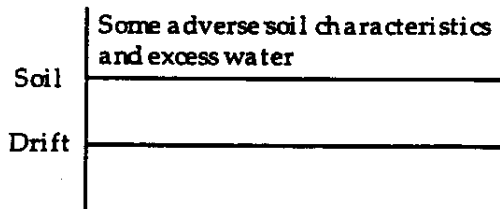
- (b) Plot areas of Drift Deposit



2. Plot soils - by class



3. Briefly describe soil



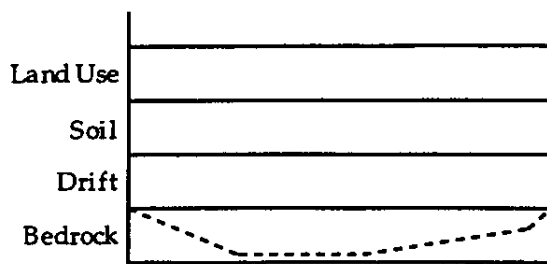
Refer to pages 62, 66, and 67.

4. Describe land use.

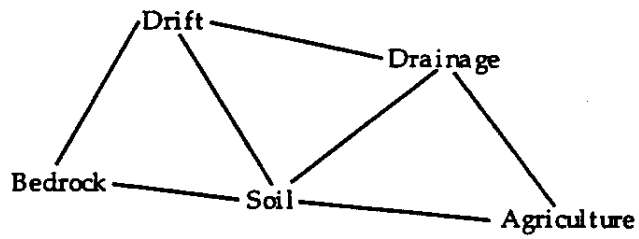
	Arable/Grain Low yield/Area
Soil Description	
Soil	
Drift	

5. Final Diagram

Title: --



6. Explain Relationships.

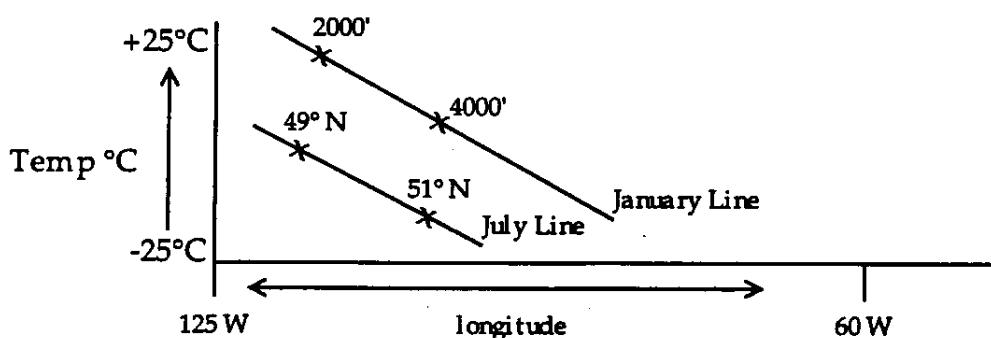


## Plan 2

### Climate Conditions in Canada

- 1) Draw a graph of temperature/longitude for the selected climate figures from Canada. Put temperature on the vertical axis and longitude on the horizontal axis.

Draw a blue line for January temperatures and a red line for July temperatures. Next to each point on the graph record a) the altitude of the location and b) the latitude of that point.



LOCATION	ALT	LAT/LONG		JAN	JULY
Halifax	41m	45°N	64°W	-3.3 °C	18.5 °C
Fredericton	40m	46°N	67°W	-9.2	19.2
Montreal	57m	46°N	74°W	-9.7	21.3
Toronto	116m	44°N	79°W	-3.9	21.9
ThunderBay	196m	48°N	89°W	-14.8	17.5
Winnipeg	240m	50°N	97°W	-17.7	20.2
Regina	574m	50°N	97°W	-16.9	19.3
Calgary	1079m	51°N	114°W	-9.9	16.7
Penticton	342m	49°N	120°W	-2.6	20.2
Vancouver	5m	49°N	123°W	2.9	17.7

- 2) Write a paragraph to explain the controls at work to produce the conditions shown across the country: a) in July; b) in January.

Similar graphs and questions could be produced for north to south lines. e.g., from S. Ontario to the Arctic.

The graph could also be adapted to show precipitation conditions across the country at selected locations.

### Plan 3

#### Analysis of Climate Statistics

Have students try to identify the location of the station from the statistics and their knowledge of Canada's climate regions.

#### Example 1:

J	F	M	A	M	J	J	A	S	O	N	D	Yr.
-2.7	-2.9	0.2	4.6	9.3	13.3	16.4	16.4	13.9	9.8	5.4	-0.2	Av. 7°C
141	116	102	99	101	87	74	96	86	108	139	134	1283mm

#### Suggested Location

A coastal town in the Maritime region - probably on the Atlantic coast in Nova Scotia.

#### Reasons for Choice

The winters are mild for Canada, but not mild enough for the west coast. Only three areas of Canada would have winters as mild as this - the interior valleys of British Columbia (in the south), Southern Ontario and the East Coast.

The cool summer and high rainfall eliminate the first possibilities so an east coast location is the most likely situation. Because the winter is so mild, a location right on the Atlantic coast and in the south of the region would be most likely. (Actual location - Yarmouth, Nova Scotia)

#### Controls at Work to Produce These Conditions

- 1) The mild winter and rather cool summer are produced by the nearness of the sea which warms up slowly in spring and cools down slowly in the Fall.
- 2) The temperatures here are not as mild as the west coast because the dominant flow of air is from west to east. In winter therefore, cold continental air is often brought over the region. This air is often warmed by the contact with the Atlantic air but is still colder than normal maritime or sea air.
- 3) The high rainfall is produced by:
  - a) the close contact with the sea which is the source of all precipitation
  - b) the constant succession of mid-latitude cyclones which flow over this region from southwest to northeast. The rainfall associated with the fronts in these storms can bring rain at any season. However, cyclones are more common in the late fall and winter so rainfall is heaviest at these times.

### Example 2:

J	F	M	A	M	J	J	A	S	O	N	D	Yr.
-9.2	-8.6	-2.8	4.3	10.8	15.8	19.2	18.3	13.8	7.8	1.4	-6.9	Av. 5.3°C
99	83	81	88	85	96	89	81	93	99	110	93	1097mm

### Suggested Location

Either the Saint Lawrence Lowlands or an inland location in the Maritimes. The Maritime location is the most likely.

### Reasons for Choice

The temperatures suggest an inland or continental type of climate with cold winters and warm summers. However, the heavy rainfall suggests a coastal location. These two conditions together suggest eastern Canada near the coast but under the influence of the westerly winds from the interior.

The temperature patten for inland New Brunswick and the St. Lawrence Valley is very similar, so are the total amounts of precipitation. However, the coastal areas usually have a rainfall maximum in late fall and winter; the more inland locations often have a summer maximum as convectional rainfall is common at that season. For this reason, this situation is most likely to be in New Brunswick.

(Actual location - Fredericton, NB)

### Controls at Work to Produce These Conditions

Most of the controls are similar to those mentioned in Example 1. However, the colder winters and warmer summers show a more inland location in an area where the dominant wind direction is from the continental interior to the west.

The rainfall pattern is similar to Example 1, although the amounts are a little smaller as it is further from the sea.

The differences between these two examples from the same region, show how the full maritime effect of the ocean is limited to a narrow coastal region in an area where the prevailing winds are often in an offshore direction.

Attempt a similar analysis for the following figures:

1) **Yellowknife**

J	F	M	A	M	J	J	A	S	O	N	D	Yr.
-27.7	-25.9	-17.8	-7.9	4.1	11.8	15.9	14.1	7.2	-1.3	-13.8	-23.9	-5.4°C
13	12	13	10	17	16	36	35	30	28	23	21	254mm

2) **Coppermine**

J	F	M	A	M	J	J	A	S	O	N	D	Yr.
-28.6	-30.1	-25.8	-17.2	-5.6	3.4	9.3	8.4	2.6	-6.9	-19.9	-26.3	-11.4°C
12	8	13	10	12	20	34	44	28	26	15	11	233mm

3) **Vancouver**

J	F	M	A	M	J	J	A	S	O	N	D	Yr.
2.9	4.1	6.2	9.1	12.8	15.8	17.7	17.6	14.3	10.2	6.2	4.2	10.1°C
140	120	96	58	49	47	26	35	54	117	138	164	1044mm

4) **London**

J	F	M	A	M	J	J	A	S	O	N	D	Yr.
-6	-5.6	-0.7	6.6	12.3	18.2	20.5	19.7	15.7	9.9	3.1	-3.6	7.5°C
76	65	72	78	75	81	81	73	79	74	83	87	924mm

5) **Cranbrook, British Columbia**

J	F	M	A	M	J	J	A	S	O	N	D	Yr.
-9.2	-5.6	-0.3	6.2	11.0	14.2	18	16.8	12.2	5.9	-2.1	-5.5	5.8°C
45	39	22	22	37	56	23	32	27	34	35	45	417mm

## Plan 4

Using statistics for climate stations 1 to 10:

- (a) Plot climographs (See Canada: Exploring New Directions, p. 59) or hythergraphs (Graph temperature on the vertical axis and precipitation on the horizontal axis. See Countdown Canada for instructions.)
  
- (b) From the above graphs, complete the summary chart and suggest locations, i.e., nearest major town or city.

N.B. Students should be aware that climatic data may vary from one source to another - a result of averaging different years and selection of weather station.

Possible answers are:

- 1. Edmonton
- 2. Halifax
- 3. Inuvik
- 4. Churchill
- 5. Prince Rupert
- 6. Vancouver
- 7. Ottawa
- 8. St. John's
- 9. Toronto
- 10. Regina

Analysis of Climate Statistics

Station A		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	
	Altitude in Metres													
1	T	-15.0	-11.1	-5.0	4.4	10.6	13.9	16.1	15.0	10.0	5.0	-3.9	-10.6	2.5
	P	22.9	15.2	20.3	22.9	48.3	78.7	83.8	58.4	33.0	17.8	17.8	20.3	439.4
2	T	-5.0	-5.0	-1.1	3.9	10.0	14.4	17.8	18.3	14.4	9.4	3.9	-2.2	6.6
	P	137.2	109.2	124.5	114.3	104.1	101.6	96.5	111.8	104.1	137.2	134.6	137.2	1412.3
3	T	-27.8	-26.7	-22.2	-12.8	-0.6	9.4	13.3	10.0	3.3	-6.7	-19.4	-26.7	-8.9
	P	12.7	12.7	10.2	12.7	12.7	20.3	35.6	35.6	22.9	22.9	20.3	10.2	228.8
4	T	-28.3	-26.7	-21.1	-10.0	-1.1	6.1	11.7	11.1	5.0	-2.8	-14.4	-23.9	-7.9
	P	12.7	15.2	22.9	22.9	22.9	48.3	55.9	68.6	58.4	35.6	25.4	17.8	406.6
5	T	1.1	2.2	3.9	6.1	8.9	11.7	12.8	13.9	11.7	8.3	5.0	2.2	7.3
	P	248.9	193.0	213.4	170.2	134.6	104.1	121.9	129.5	195.6	309.9	312.4	287.0	2420.5
6	T	2.2	3.9	6.1	9.4	12.8	15.6	17.8	17.2	13.9	10.0	6.1	3.9	9.9
	P	218.4	147.3	127.0	83.8	71.1	63.5	30.5	43.2	91.4	147.3	210.8	223.5	1457.8
7	T	-11.1	-11.1	-4.4	5.0	12.8	18.3	20.6	18.9	14.4	7.2	0.0	-8.9	5.1
	P	73.7	55.9	71.1	68.6	63.5	88.9	86.4	66.4	81.3	73.7	76.2	66.0	871.7
8	T	-5.0	-5.6	-2.8	1.1	5.5	11.1	15.0	16.1	12.2	7.8	2.8	-1.7	4.7
	P	134.6	124.5	116.8	106.7	91.4	88.9	88.9	93.9	96.5	134.6	149.9	139.7	1366.4
9	T	-5.0	-5.6	-1.1	5.6	11.7	17.8	20.6	19.4	15.6	8.9	2.8	-2.8	7.3
	P	68.6	60.9	66.0	63.5	73.7	68.6	73.7	68.6	73.7	60.9	71.1	66.0	815.3
10	T	-17.8	-16.7	-8.9	3.3	10.6	15.6	18.3	16.7	10.6	3.9	-6.1	-13.3	1.4
	P	12.7	7.6	17.8	17.8	45.7	83.8	60.9	45.7	33.0	22.9	15.2	10.2	373.3

T - Temperature in degrees C P - Precipitation in millimeters of water





## Plan 5

### Duration of Bright Sunshine in Canada

#### Lesson 1

1. Plot the figures (not place names) of average annual total of bright sunshine in hundreds of hours (e.g., Gander = 15) on the outline map of Canada.
2. Draw an isoline to show zone(s) of more than 2000 hours. Shade the area with more than 200 hours.
3. Mark H in area of highest value and L in area of lowest value.
4. Which two stations have the lowest reading in December? b) Account for these low readings.
5. a) Which two station have the highest readings in June? b) Account for these high readings.
6. Why does the pattern of bright sunshine not correspond with lines of latitude?

#### Lesson 2

7. Which of: Ottawa, Ontario; Chatham, New Brunswick; Fort Smith, Northwest Territories; would best suit the needs of the Canadian Air Force to train CF-18 pilots. It is necessary that the location have bright sunshine, and be used twelve months of the year on a regular basis. In your answer make reference to total range, mean and standard deviation, with respect to duration of bright sunshine.

#### **Description**

The exercise centers on each student drawing an isoline map, based on list of climatic statistics, and interpreting the pattern produced. It requires the transfer of statistical information from the list, with the aid of an atlas, to an outline map of Canada. Written and research skills are required to explain the map pattern with respect to (a) latitude (b) summer and winter solstices (c) prevailing air masses and cloud cover. Students use a physical geography text for reference. Mathematical skills and concepts are utilized in the second part of the exercise (question 7 student question sheet).

## Objectives and Results

The objectives of the project:

1. To increase familiarity with atlas and textbook.
2. To create a map which shows the relationship between latitude and hours of bright sunshine. Thus encouraging careful mapping skills.
3. To make use of interpretation and written skills to explain the distribution pattern.
4. Produce a map which may be used to help explain patterns of annual temperature range, and of grain production.
5. To make use in a geographical context of skills and concepts learned in a mathematical class.
6. To provide an exercise which can be used with students of varying academic abilities at the grade twelve level.
7. To demonstrate the usefulness of geography in political decision making.
8. To provide an exercise of special concern to students of a school where many of their parents are employed by the military.

Evaluation Marks are awarded for:

1. Accurate plotting of statistics on the outline map.
2. Drawing the isoline of 2000 hours of bright sunshine.
3. Marking on the map, the areas of lowest and highest bright sunshine.
4. Written explanation for extreme readings: January at Inuvik and Coppermine, June at Inuvik and Yellowknife.
5. Written answer to question 6 (student question sheet) which should include reference to air masses and prevailing wind directions.
6. Accurate determination of total, range, mean and standard deviation for each of Chatham, Ottawa, and Fort Smith.
7. A clear statement indicating the significance of the results from '6' above as related to question 7 (student question sheet).

## **Lesson Plan**

This exercise was introduced in the curriculum of Canadian Geography 120 as an addition to the regular discussion of Canadian climate.

### Period One

1. Discussion of sunshine receipt and noting that all places on earth have the potential to receive the same number of hours of daylight over a year.
2. Distribution of statistical table, Average Duration of Bright Sunshine in Hours. Discuss measure of bright sunshine in hours. Discuss measure of bright sunshine, instrument used, and recording practice.
3. Discussion of use of the sunshine statistics for:
  - (a) agricultural value (especially solar energy for building proteins in grains).
  - (b) solar heating
  - (c) film production
  - (d) flying
4. Distribution of exercise. Explanation given for plotting in hundreds of hours (map less cluttered). Students reminded of need for accurate plotting and technique for isoline plotting.
5. Distribution of atlas (Oxford Economic), one per student. Students are reminded to use the index for latitude and longitude of locations, and provincial maps for accurate placement on outline map.
6. Distribution of outline map of Canada.
7. Students work individually to end of period.

### Period Two

1. Brief discussion of determination and use of measures of central tendency. Explanation of terms average, mean, range, and standard deviation.
2. Students complete map and questions using physical geography text as necessary.

### **Materials and Sources**

Canadian Oxford Atlas

Outline Map of Canada

Physical Environment Text - Inch and Stone - McGraw-Hill

Canadian Weather Statistics - Atmospheric Environment Service  
Environment Canada  
4905 Dufferin Street  
Downsview, Ontario M3H 5T4

# Average duration of bright sunshine in hours

Station	Type	Ja	Fe	Mr	Al	Ma	Jun	Jul	Au	Se	Oc	No	De	Annual
<i>Newfoundland</i>														
Gander	2	73	85	102	116	155	169	202	180	145	112	62	60	1461
Goose Bay	1	88	119	141	147	179	194	212	205	143	102	71	73	1674
St. John's	1	64	76	89	116	158	188	213	184	145	111	62	52	1458
<i>Prince Edward Island</i>														
Charlottetown	3	83	105	137	156	199	215	244	220	180	133	72	59	1803
<i>Nova Scotia</i>														
Annapolis Royal	-	62	86	139	156	206	205	236	219	177	141	74	52	1753
Sherwater	1	110	129	148	176	217	217	220	214	172	155	98	90	1946
Sydney	1	81	106	126	161	204	222	251	225	168	139	74	67	1824
Yarmouth	1	71	94	136	173	229	209	202	201	168	146	85	58	1772
<i>New Brunswick</i>														
Chatham	1	110	121	148	180	211	226	255	235	181	144	91	96	1998
Fredericton	3	103	118	141	160	201	203	234	218	166	140	85	91	1860
Moncton	1	103	120	135	168	212	226	247	223	166	141	87	90	1918
Saint John	1	99	118	143	160	202	199	218	204	163	138	87	88	1819
<i>Quebec</i>														
Lernoxville	3	79	102	135	162	212	229	256	229	166	135	67	60	1832
Montreal/McGill	-	93	109	156	171	220	241	264	238	180	140	70	77	1959
Quebec	1	81	99	139	163	198	196	233	208	167	126	63	65	1708
Schefferville	1	82	117	165	191	168	198	188	145	101	67	45	61	1528
Sept-Iles	1	103	135	163	222	232	248	253	219	166	125	88	97	2051
<i>Ontario</i>														
Harrow	-	77	97	126	162	229	247	277	258	191	163	82	71	1980
Kapuskasing	3	76	104	143	165	190	215	233	203	122	92	40	52	1635
London	1	69	96	128	170	233	243	274	253	177	153	73	61	1930
New Liskeard	-	72	103	153	168	176	166	233	204	134	97	46	50	1602
North Bay	1	97	130	158	188	231	246	267	226	158	115	59	70	1945
Ottawa	2	96	115	150	175	231	245	277	243	171	138	76	78	1995
Thunder Bay	1	116	149	185	205	235	258	302	251	173	116	80	92	2162
Toronto	-	87	110	145	179	221	256	281	257	197	153	82	77	2045
<i>Manitoba</i>														
Churchill	1	78	130	183	196	182	234	285	134	104	62	45	55	1789
The Pas	1	103	129	172	217	277	263	301	246	147	120	63	70	2108
Winnipeg	2	112	139	170	209	246	259	331	276	183	158	81	86	2230
<i>Saskatchewan</i>														
Prince Albert	1	94	115	168	212	259	258	303	269	170	143	80	72	2143
Regina	1	98	117	156	210	271	253	337	293	194	169	96	83	2277
Saskatoon	1	99	129	192	225	279	280	341	294	207	175	98	84	2403
<i>Alberta</i>														
Calgary	2	99	121	156	196	237	240	317	278	188	166	116	94	2208
Edmonton	4	91	113	176	224	272	265	306	269	185	161	105	80	2237
Medicine Hat	1	91	118	149	199	256	261	342	292	188	165	105	86	2170
<i>British Columbia</i>														
Estevan Point	-	58	83	132	159	217	217	241	190	166	108	69	50	1690
Kamloops	1	54	93	150	187	245	244	308	275	194	121	63	43	1977
Kimberley	1	31	109	183	181	276	242	346	307	182	146	89	32	2124
Prince George	1	54	89	139	187	255	256	279	245	158	104	60	39	1865
Prince Rupert	-	42	59	86	118	159	120	120	119	95	54	40	24	1036
Vancouver	2	55	93	129	180	253	243	305	255	188	116	70	44	1931
Victoria Gonx.Hts.	-	70	98	150	198	277	276	338	287	209	139	81	60	2183
<i>Yukon Territory</i>														
Whitehorse	1	42	81	160	230	267	271	250	225	134	96	48	21	1825
<i>North West Territories</i>														
Coppermine	-	5	75	154	220	226	289	305	194	69	46	12	0	1595
Fort Smith	1	60	110	175	235	283	302	299	261	125	90	47	30	2017
Frobisher Bay	1	35	88	181	234	183	165	210	143	78	59	43	16	1435
Inuvik	1	9	68	173	254	289	366	314	208	110	53	19	0	1863
Yellowknife	1	66	101	210	255	323	354	359	259	119	43	40	15	2135

- 1 = Airport
- 2 = International airport
- 3 = Agriculture Canada
- 4 = Industrial airport

Analysis of Climate Statistics

Station A	Altitude in Metres	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	
1	T 676	-15.0	-11.1	-5.0	4.4	10.6	13.9	16.1	15.0	10.0	5.0	-3.9	-10.6	2.5
	P	22.9	15.2	20.3	22.9	48.3	78.7	83.8	58.4	33.0	17.8	17.8	20.3	439.4
2	T 30	-5.0	-5.0	-1.1	3.9	10.0	14.4	17.8	18.3	14.4	9.4	3.9	-2.2	6.6
	P	137.2	109.2	124.5	114.3	104.1	101.6	96.5	111.8	104.1	137.2	134.6	137.2	1412.3
3	T 9	-27.8	-26.7	-22.2	-12.8	-0.6	9.4	13.3	10.0	3.3	-6.7	-19.4	-26.7	-8.9
	P	12.7	12.7	10.2	12.7	12.7	20.3	35.6	35.6	22.9	22.9	20.3	10.2	228.8
4	T 13	-28.3	-26.7	-21.1	-10.0	-1.1	6.1	11.7	11.1	5.0	-2.8	-14.4	-23.9	-7.9
	P	12.7	15.2	22.9	22.9	22.9	48.3	55.9	68.6	58.4	35.6	25.4	17.8	406.6
5	T 52	1.1	2.2	3.9	6.1	8.9	11.7	12.8	13.9	11.7	8.3	5.0	2.2	7.3
	P	248.9	193.0	213.4	170.2	134.6	104.1	121.9	129.5	195.6	309.9	312.4	287.0	2420.5
6	T 14	2.2	3.9	6.1	9.4	12.8	15.6	17.8	17.2	13.9	10.0	6.1	3.9	9.9
	P	218.4	147.3	127.0	83.8	71.1	63.5	30.5	43.2	91.4	147.3	210.8	223.5	1457.8
7	T 103	-11.1	-11.1	-4.4	5.0	12.8	18.3	20.6	18.9	14.4	7.2	0.0	-8.9	5.1
	P	73.7	55.9	71.1	68.6	63.5	88.9	86.4	66.4	81.3	73.7	76.2	66.0	871.7
8	T 74	-5.0	-5.6	-2.8	1.1	5.5	11.1	15.0	16.1	12.2	7.8	2.8	-1.7	4.7
	P	134.6	124.5	116.8	106.7	91.4	88.9	88.9	93.9	96.5	134.6	149.9	139.7	1366.4
9	T 116	-5.0	-5.6	-1.1	5.6	11.7	17.8	20.6	19.4	15.6	8.9	2.8	-2.8	7.3
	P	68.6	60.9	66.0	63.5	73.7	68.6	73.7	68.6	73.7	60.9	71.1	66.0	815.3
10	T 574	-17.8	-16.7	-8.9	3.3	10.6	15.6	18.3	16.7	10.6	3.9	-6.1	-13.3	1.4
	P	12.7	7.6	17.8	17.8	45.7	83.8	60.9	45.7	33.0	22.9	15.2	10.2	373.3

T - Temperature in degrees C P - Precipitation in millimeters of water

Environment  
Canada

Environnement  
Canada

TEMPERATURE, PRECIPITATION, SUNSHINE AND FROST DATA  
FOR SELECTED STATIONS IN CANADA

Atmospheric  
Environment

Environnement  
atmosphérique

TEMPÉRATURE, PRÉCIPITATION, INSOLATION ET DONNÉES SUR LE GEL  
DE STATIONS SÉLECTIONNÉES DU CANADA

Station		Elevation (feet) Altitude (pieds)		TEMPERATURE										PRECIPITATION			
		Elevation (Metres) Altitude (Mètres)		AVERAGES MOYENNES					EXTREMES EXTREMES					AVERAGES MOYENNES		AVERAGE ANNUAL NUMBER OF DAYS WITH ICE/FROST ANNUELLE DU NOMBRE DE JOURS AVEC	
		Mean January Moyenne de Janvier	Mean July Moyenne de Juillet	Mean Annual Moyenne Annuelle	Mean Annual Maximum Moyenne des Températures Maximales Annuelles	Mean Annual Minimum Moyenne des Températures Minimales Annuelles	Year of Record Année d'origine de l'histoire	Record High Maximum Absolu	Record Low Minimum Absolu	Total Annual Heating Degree-Days Below 18°C Total des Chaudières Inférieures à 18°C	Total Annual Precipitation Précipitation Totale Annuelle	Total Annual Snow Fall Chute de Neige Totale	Total Annual Precipitation Précipitation Totale Annuelle	Total Annual Snow Fall Chute de Neige Totale			
		°C	°C	°C	°C	°C	Year Année	°C	°C	Days Jours	mm	cm	Days Jours	Days Jours			
GANDER INT'L A	NFLD	482	147	-6	17	4	31	-22	36	36	-26	5015	1078.2	354.9	204	92	
GOOSE A	NFLD	144	44	-16	16	0	32	-34	31	38	-39	6494	876.8	409.1	176	94	
ST. JOHN'S A	NFLD	463	141	-4	15	5	28	-18	31	31	-23	4798	1511.5	363.9	210	85	
CHARLOTTETOWN A	PEI	186	57	-7	18	6	30	-24	30	34	-28	4565	1127.8	305.1	169	60	
GREENWOOD A	NS	82	25	-5	19	7	33	-24	30	37	-30	4149	1040.1	263.0	160	57	
SHEARWATER A	NS	136	41	-4	18	7	30	-21	29	33	-26	4104	1381.3	300.9	142	36	
SYDNEY A	NS	197	60	-4	18	6	32	-21	32	35	-26	4433	1340.9	288.1	179	67	
YARMOUTH A	NS	136	38	-3	16	7	27	-17	33	30	-21	4012	1283.2	204.5	157	46	
CHATHAM A	NB	113	34	-9	19	5	34	-29	30	38	-35	4827	1051.2	309.4	152	58	
FREDERICTON CDA	NB	130	39	-9	19	5	33	-31	93	39	-39	4652	1084.2	243.6	140	38	
MONCTON	NB	40	12	-8	19	5	33	-29	75	37	-38	4683	1099.3	261.9	152	49	
SAINT JOHN	NB	100	30	-7	17	6	29	-24	97	34	-30	4693	1305.6	216.9	149	39	
BAGOTVILLE A	QUE	536	163	-16	18	2	33	-36	30	36	-43	5738	936.6	341.6	177	82	
LENOXVILLE	QUE	498	152	-11	19	5	33	-36	61	37	-44	4838	1038.1	272.3	169	62	
MONT JOLI A	QUE	150	46	-11	17	4	31	-28	30	34	-33	5308	900.3	366.8	156	76	
MONTREAL-MCGILL	QUE	187	57	-9	22	7	33	-26	102	36	-34	4437	999.0	243.1	164	61	
QUEBEC A	QUE	245	75	-12	19	4	32	-31	30	36	-36	5024	1088.6	326.7	164	67	
SCHERBVILLE A	QUE	1681	512	-23	13	-5	28	-43	25	32	-51	8197	7221.3	535.5	188	115	
SEPT-ÎLES A	QUE	190	58	-14	15	1	28	-35	29	32	-43	6096	1090.3	423.1	144	66	
VAL D'OR A	QUE	1108	338	-17	17	2	32	-39	22	34	-44	5955	902.1	279.3	180	94	
EARLTON A	ONT	805	245	-16	18	2	33	-40	35	37	-45	5833	790.5	235.2	161	80	
KAPUSKASING A	ONT	752	229	-18	17	1	32	-39	36	36	-46	6330	871.5	321.8	186	103	
LONDON A	ONT	912	278	-6	21	8	33	-24	33	37	-32	4038	924.5	201.1	165	66	
MUSKOKA A	ONT	926	282	-10	19	5	32	-34	35	35	-41	4797	993.1	293.6	164	75	
NORTH BAY A	ONT	1210	369	-13	18	4	31	-33	34	34	-40	5289	959.3	284.3	178	84	
OTTAWA INT'L A	ONT	413	126	-11	21	6	34	-30	35	38	-36	4635	850.9	215.9	152	60	
SIOUX LOOKOUT A	ONT	1227	374	-19	18	1	33	-39	35	36	-46	6205	741.5	236.7	165	87	
THUNDER BAY A	ONT	644	194	-15	18	2	31	-35	32	36	-41	5708	738.5	222.1	141	63	
TORONTO	ONT	379	116	-4	22	9	34	-22	159	41	-33	3658	789.9	141.1	134	41	
WILKINSON A	ONT	720	219	-7	19	6	32	-25	26	36	-33	4373	944.0	308.1	163	79	
WINDSOR A	ONT	637	194	-4	22	9	35	-19	33	38	-26	3557	836.1	103.6	137	42	
CHURCHILL A	MAN	115	35	-28	12	-7	30	-41	30	33	-45	9193	396.6	191.8	141	93	
THE PAS A	MAN	894	272	-22	18	-1	32	-41	30	37	-49	6806	449.7	160.3	127	70	
WINNIPEG INT'L A	MAN	786	240	-18	20	2	35	-37	35	41	-45	5664	535.2	131.3	120	58	
PRINCE ALBERT A	SASK	1414	431	-21	18	0	34	-44	30	38	-50	6623	389.0	124.0	119	62	
REGINA A	SASK	1645	501	-19	19	2	36	-39	32	40	-48	6053	352.4	112.7	101	52	
CALGARY INT'L A	ALTA	3540	1079	-11	17	3	32	-34	89	36	-45	5948	437.1	133.9	113	61	
EDMONTON IND. A	ALTA	2219	676	-15	18	3	32	-36	35	34	-48	5600	446.5	132.1	124	60	
GRANDE PRAIRIE A	ALTA	2190	668	-17	16	1	31	-42	31	34	-52	6130	442.0	175.6	130	66	
MEDICINE HAT A	ALTA	2365	721	-12	20	5	37	-41	89	42	-46	4859	347.8	121.4	90	42	
ESTEVAN POINT	BC	20	6	5	14	9	23	-6	30	29	-14	3192	3027.9	34.3	202	9	
KAMLOOPS A	BC	1133	345	-6	21	8	37	-26	22	41	-37	3727	260.6	77.1	90	30	
KIMBERLEY A	BC	3016	919	-9	18	5	35	-31	26	42	-44	4800	377.6	154.2	111	50	
LYTTON	BC	838	255	-4	22	10	39	-21	26	41	-32	3243	463.0	142.8	102	30	
PENTICTON A	BC	1121	342	-3	20	9	37	-18	32	41	-27	3509	296.2	69.2	101	25	
PRINCE GEORGE A	BC	2218	674	-12	15	3	31	-39	31	34	-50	5318	620.7	233.4	164	77	
PRINCE RUPERT	BC	170	52	2	14	8	27	-11	55	32	-21	3847	2114.5	93.2	226	21	
VANCOUVER INT'L A	BC	16	5	2	17	10	28	-11	36	33	-18	3031	1068.1	52.4	158	11	
VICTORIA INT'L A	BC	67	20	3	16	10	31	-9	33	36	-16	2967	856.5	45.5	154	11	
DAWSON	YT	1062	324	-29	16	-5	29	-51	74	35	-58	8232	325.5	136.4	120	65	
WHITEHORSE A	YT	2289	698	-19	14	-1	29	-44	31	34	-52	6855	260.3	127.8	118	71	
ALEKT	NWT	205	63	-32	4	-18	16	-46	23	20	-49	13093	156.1	144.8	99	94	
COPPERMINE	NWT	28	9	-29	9	-12	26	-44	42	32	-50	10672	216.3	101.9	110	75	
FORT SMITH A	NWT	665	203	-27	16	-4	31	-47	30	35	-54	7803	331.2	144.5	127	78	
FROBISHER BAY A	NWT	68	21	-26	8	-9	21	-42	27	24	-46	9820	415.2	246.9	135	97	
INUVIK A	NWT	200	61	-29	13	-10	29	-49	16	32	-57	10183	260.3	174.0	128	99	
YELLOWKNIFE A	NWT	682	208	-29	16	-6	28	-46	31	32	-51	8601	250.0	119.4	114	73	

Note: Abbreviations used in these tables are as follows:

A - Airport  
CDA - Canadian Department of Agriculture  
INT'L A - International Airport  
IND A - Industrial Airport

Remarque: Abréviations qui figurent dans les tableaux:

A - Aéroport  
CDA - Ministère de l'Agriculture du Canada  
INT'L A - Aéroport International  
IND A - Aéroport Industriel

**Monthly and Annual Total Precipitation in Millimetres**  
**Précipitations Totales Mensuelles et Annuelles en Millimètres**

Station		Jan. Janv.	Feb. Fév.	March Mars	April Avril	May Mai	June Juin	July Juil.	Aug. Août	Sept. Sept.	Oct. Oct.	Nov. Nov.	Dec. Déc.	Annual Annuelle
Gander Int'l A	NF	94	100.8	96.8	85.1	62.5	76.2	77.7	100.8	84.1	95.3	106.9	98	1078.2
Goos A	NF	69.1	60.2	69.3	54.1	61.7	81.5	102.1	92.7	76	71.9	69.9	68.3	876.8
St. John's A	NF	145	156.2	132.6	114.1	99.1	88.7	83.1	113.3	112	138.7	161.3	167.4	1511.5
Charlottetown A	PEI	110.7	95	84.6	82	82	83.1	73.2	92.5	86.4	96.8	125.7	115.8	1127.8
Greenwood A	NS	117.1	96.8	77	79	74.9	73.9	62.7	90.7	74.2	86.9	111.8	115.1	1060.1
Shearwater A	NS	147.3	128.5	111.8	105.4	109.5	85.1	92	94	94.2	113.3	151.9	148.3	1381.3
Sydney A	NS	137.2	118.6	119.4	95.3	99.6	80.8	78.5	99.6	99.1	111.8	161.3	139.7	1340.9
Yarmouth A	NS	140.7	115.8	101.9	98.6	100.8	87.4	73.9	96.5	86.1	108.5	138.9	134.1	1283.2
Chatham A	NB	97	90.7	83.8	75.7	80.3	83.6	75.7	83.6	87.1	88.4	112.3	93	1051.2
Fredericton CDA	NB	90.7	86.4	73.4	80.8	87.6	86.1	90.2	85.9	86.9	90.9	119.9	105.4	1084.2
Moncton A	NB	106.7	100.1	93.2	84.1	80.3	90.7	79.5	79.8	73.2	90.7	112.5	108.5	1099.3
Saint John	NB	125.7	114.1	98.3	99.8	102.9	93.7	89.7	99.8	99.8	104.7	145.3	131.8	1305.6
Bagotville A	QC	67.6	63.3	53.1	49	70.1	100.6	111	96.3	98.6	68.8	78.7	79.5	936.6
Lennoxville CDA	QC	76	74.7	69.1	79	85.9	102.9	101.4	95.5	83.3	88.4	92.5	89.4	1038.1
Mont Joli A	QC	89.4	79.3	64	54.4	66.3	70.9	73.9	74.7	80.5	75.2	82	89.7	900.3
Montreal McGill	QC	79.5	71.4	75.2	77	74.9	87.1	93	91.7	86.6	79	92.7	90.9	999
Quebec A	QC	85.9	76.7	69.3	74.7	80.8	101.9	107.7	102.6	105.7	82.3	99.6	101.4	1088.6
Schefferville A	QC	41.2	36.6	36.8	34.8	44.7	79	88.7	98	82.8	70.1	63.8	46	722.5
Sept-Îles A	QC	99.8	92	72.9	58.2	81.8	85.6	103.9	98.8	100.8	87.4	109.5	99.6	1090.3
Val d'Or	QC	57.2	55.1	55.1	46.2	58.4	89.9	96.5	100.8	104.9	78	90.7	69.3	902.1
Earlton A	ON	53.6	45	44.5	45	63.8	92	80	82.8	96.8	64.3	69.9	52.8	790.5
Kapuskasing A	ON	53.3	47.5	53.9	50.8	79.3	85.3	95.5	92.2	92.2	78.2	87.4	55.9	871.5
London A	ON	76.2	65.3	71.9	78.2	74.9	81	81.3	73.4	78.7	74.2	82.8	86.6	924.5
Muskoka A	ON	82.8	60.2	67.6	68.8	78.7	77.5	86.1	75.4	99.8	91.7	102.1	102.4	993.1
North Bay A	ON	72.4	58.7	62.5	64.5	72.9	86.4	102.1	86.4	115.8	85.1	93	79.5	959.3
Ottawa Int'l A	ON	59.9	56.9	61	67.6	70.1	72.6	81.3	81.5	78.7	65.8	78.5	77	850.9
Sioux Lookout A	ON	38.4	30.2	33.5	45	69.6	96.8	95.5	86.6	92.2	63	54.1	36.6	741.5
Thunder Bay A	ON	48	30.2	43.7	56.4	74.7	82.8	71.1	87.9	83.6	56.9	57.2	46	738.5
Toronto	ON	62.5	56.6	65.5	67.3	72.9	63	80.8	67.3	61.2	61.5	67.3	64	789.9
Warton A	ON	98.3	71.9	62.5	71.1	64.3	63.3	68.1	77.2	84.8	83.1	96.8	102.6	944
Windsor A	ON	55.4	52.1	66.3	81	83.1	83.6	82.8	82.3	60.7	63.3	62	63.5	836.1
Churchill A	MN	14	13	17.8	24.1	28.2	40.1	49	57.7	52.1	40.4	40.1	20.1	396.6
The Pas A	MN	18.5	16.5	20.6	25.4	37.9	59.2	72.4	61.5	55.1	30.7	29	22.9	449.7
Winnipeg Int'l A	MN	23.6	19.1	26.2	37.3	57.2	80.3	80.3	73.7	52.6	34.8	27.2	22.9	535.2
Prince Albert A	SK	17.3	16.8	18.8	24.1	35.8	57.2	64.3	53.1	34.8	24.1	20.6	22.1	389
Regina A	SK	18	17.3	18.3	23.4	40.9	82.6	57.9	49.8	36.3	19.1	18	16.3	397.9
Saskatoon A	SK	18.3	18	16.8	20.6	34	57.4	53.1	45.2	33	19.1	18.8	18.3	352.6
Calgary Int'l A	AB	17	19.8	20.3	29.5	49.8	91.7	68.3	55.9	35.3	18.8	16	14.7	437.1
Edmonton Ind A	AB	25.2	20.1	16.8	23.4	37.3	74.7	83.3	71.6	35.8	18.5	18.5	21.3	446.5
Grande Prairie A	AB	34	28.2	21.3	21.6	37.6	64.5	60.5	52.6	34.3	25.9	31	30.5	442
Medicine Hat A	AB	22.6	18.3	19.3	25.2	38.1	63.5	38.6	39.4	33	17	16.3	16.5	347.8
Estevan Point	BC	385.3	318	292.1	232.7	120.4	97	87.6	89.9	171.7	375.9	421.4	432.9	3027.9
Kamloops A	BC	28.7	15.5	8.1	12.5	19.1	36.3	25.9	26.9	20.3	18.5	20.6	28.2	260.6
Kimberley A	BC	41.9	27.2	21.8	18.3	34.5	51.8	21.1	31.5	23.6	28.2	35.3	42.4	377.6
Lytton A	BC	74.9	51.1	28.5	19.1	14.7	20.6	12.2	18.8	23.4	50.3	68.6	80.8	463
Penticton A	BC	31.5	20.8	16.5	23.1	27.7	35.6	24.6	22.4	18	19.8	25.7	30.5	296.2
Prince George A	BC	59.2	42.9	31.5	29.5	42.2	58.2	57.9	73.4	55.9	61	54.9	54.1	620.7
Prince Rupert	BC	214.1	208.8	180.3	183.9	122.7	107.2	120.9	147.1	241.8	359.2	269.2	259.3	2414.5
Vancouver Int'l A	BC	147.3	116.67	93.7	61	47.5	45.2	29.7	37.1	61.2	122.2	141.2	165.4	1068.1
Victoria Int'l A	BC	146.3	96.8	69.1	44.2	30.5	29.2	18.5	24.9	36.6	87.4	127.5	145.5	856.5
Dawson	YT	19.3	16	12.7	9.1	21.8	36.8	53.1	50.6	28.5	26.7	25.2	25.7	325.5
Whitehorse A	YT	18.5	14	14.7	10.7	13.5	28.7	33.3	36.1	29	19.8	22.4	19.6	260.3
Alert	NWT	7.6	5.3	7.1	6.6	10.7	13.5	18	27.4	27.9	15.8	8.1	8.1	156.1
Coppermine	NWT	10.4	5.8	11.2	10.4	11.2	16.8	33.5	39.9	27.2	25.2	14.5	10.2	216.3
Fort Smith A	NWT	17.5	15.5	14.5	17.5	24.6	33.8	52.8	37.9	37.6	28.7	27.7	23.1	331.2
Frobisher Bay A	NWT	24.4	27.9	20.6	22.4	22.9	37.9	53.1	57.9	43.4	41.7	36.8	26.2	415.2
Inuvik A	NWT	20.3	10.4	16.5	14	17.5	13	34.3	46.2	21.1	33.8	14.7	18.5	260.3
Yellowknife A	NWT	13.7	12.2	11.7	10.2	14	17.3	33.3	36.3	28.2	30.7	23.9	18.5	250



# FROST DATA DONNÉES SUR LE GEL

Station	AVERAGES BASED ON 1941-70 PERIOD OF RECORD. MOYENNES BASÉES SUR LA PÉRIODE DES RELEVÉS DE 1941 À 1970				EXTREMES BASED ON FULL PERIOD OF RECORD EXTRÊMES BASÉS SUR TOUTE LA PÉRIODE DES RELEVÉS											
	Years Années	Frost-Free Period (Days) Période sans Gel (Jours)	Last Frost (Spring) Dernier Gel (Printemps)	First Frost (Fall) Premier Gel (Automne)	LAST FROST (SPRING) DERNIER GEL (PRINTEMPS)		FIRST FROST (FALL) PREMIER GEL (AUTOMNE)		LONGEST LA PLUS LONGUE			SHORTEST LA PLUS COURTE				
					Earliest Le plus tôt	Latest Le plus tard	Earliest Le plus tôt	Latest Le plus tard	Last Frost (Spring) Dernier Gel (Printemps)	First Frost (Fall) Premier Gel (Automne)	No. of Days Nombre de jours	Last Frost (Spring) Dernier Gel (Printemps)	First Frost (Fall) Premier Gel (Automne)	No. of Days Nombre de jours		
CANDLER INT. A	NF	30	122	June 4	Oct 5	34	May 15	June 22	Aug 25	Oct 18	May 24	Oct 16	144	June 13	Sept 24	102
GOOSE A	NF	29	102	June 6	Sept 17	29	May 17	June 20	Sept 2	Oct 17	June 1	Oct 17	137	June 21	Sept 2	72
ST. JOHN'S A	NF	29	130	June 3	Oct 12	29	May 18	June 28	Sept 18	Oct 26	May 24	Oct 23	151	June 28	Sept 23	86
CHARLOTTETOWN A	PEI	28	150	May 17	Oct 15	28	May 1	June 9	Sept 14	Oct 31	May 1	Oct 26	177	May 27	Sept 14	109
GREENWOOD A	NS	28	128	May 21	Sept 27	28	May 1	June 10	Sept 9	Nov 2	May 6	Nov 2	179	May 30	Sept 13	105
SHEARWATER	NS	27	173	May 5	Oct 26	27	Apr 17	June 14	Sept 10	Nov 10	Apr 26	Nov 14	201	May 29	Sept 11	138
SYDNEY A	NS	30	145	May 23	Oct 16	30	May 7	June 14	Sept 30	Nov 10	May 19	Nov 14	174	June 8	Sept 30	113
YARMOUTH A	NS	30	174	May 2	Oct 24	30	Apr 16	May 25	Oct 7	Nov 14	Apr 21	Nov 14	206	May 25	Oct 12	139
CHATHAM A	NB	28	122	May 22	Sept 21	28	May 1	June 12	Sept 3	Oct 21	May 18	Oct 21	155	June 12	Sept 14	93
FREDRIKSBURG CDA	NB	30	130	May 18	Sept 17	30	Apr 25	June 24	Sept 10	Oct 18	May 10	Oct 12	154	May 28	Sept 8	102
MONCTON	NB	30	102	June 1	Sept 12	30	May 8	June 24	Sept 16	Oct 11	May 11	Oct 12	137	June 16	Sept 8	79
SAINTE JOHN	NB	24	170	May 3	Oct 21	24	Apr 11	May 27	Sept 20	Nov 7	Apr 20	Nov 5	198	May 21	Sept 29	130
BAGOTVILLE A	QC	29	114	May 26	Sept 18	29	May 3	June 15	Sept 8	Oct 21	May 18	Oct 15	149	June 15	Sept 9	85
LINDORVILLE CDA	QC	30	104	June 13	Sept 5	30	May 11	June 29	Aug 16	Oct 7	May 13	Sept 29	138	June 21	Aug 18	92
MONT JOLI A	QC	28	135	May 21	Sept 4	28	Apr 9	June 18	Sept 11	Oct 19	May 3	Oct 14	165	June 12	Sept 13	91
MONTREAL MCGILL	QC	30	183	Apr 22	Oct 23	30	Mar 29	May 24	Sept 29	Nov 14	Apr 10	Nov 14	217	May 24	Oct 9	137
QUEBEC A	QC	29	132	May 18	Sept 28	29	Apr 29	June 7	Sept 11	Oct 21	May 4	Oct 8	156	May 24	Sept 14	112
SCHIEFFERVILLE A	QC	22	73	June 18	Aug 31	22	June 8	July 14	July 16	Sept 17	June 8	Sept 13	96	June 29	July 16	16
SEPT-ILES A	QC	26	109	May 30	Sept 17	26	Apr 30	June 15	Aug 30	Oct 11	May 18	Oct 11	145	June 12	Aug 30	78
VAL-D'OR A	QC	17	98	June 4	Sept 11	17	May 20	June 18	Aug 6	Oct 5	May 23	Oct 5	132	June 16	Aug 6	50
EARLTON A	ON	30	101	June 2	Sept 12	30	May 12	July 14	Aug 19	Oct 4	May 23	Oct 4	133	July 14	Sept 6	53
KAPUSKASING A	ON	30	83	June 13	Sept 5	30	May 24	July 14	Sept 25	Sept 25	May 24	Sept 25	121	June 24	July 17	22
LONDON A	ON	30	149	May 9	Sept 5	30	May 9	June 8	Sept 17	Oct 25	Apr 9	Oct 22	195	May 16	Sept 17	123
MUSKOKA A	ON	30	107	May 29	Sept 14	30	May 10	June 19	Aug 11	Oct 4	May 19	Oct 4	137	June 18	Sept 4	63
NORTH BAY A	ON	30	125	May 21	Sept 24	30	May 2	June 16	Sept 4	Oct 5	May 2	Oct 1	151	June 18	Aug 21	63
CITTAWA INT. A	ON	30	142	May 11	Oct 4	30	Apr 19	May 26	Sept 17	Oct 22	May 7	Oct 22	167	May 25	Sept 21	118
SOURDOCKOUT A	ON	30	113	May 29	Sept 10	30	May 11	June 14	Aug 23	Oct 16	May 11	Oct 16	157	June 13	Sept 8	86
THUNDER BAY A	ON	30	101	May 31	Sept 20	30	May 11	June 14	Aug 23	Oct 16	May 11	Oct 16	157	June 13	Sept 8	86
TORONTO	ON	30	192	Apr 20	Oct 30	131	Mar 27	June 10	Sept 29	Nov 24	Mar 27	Nov 2	219	June 10	Sept 22	61
WILKINSON A	ON	24	141	May 18	Oct 2	24	May 2	June 8	Sept 15	Oct 31	May 11	Oct 31	172	June 10	Sept 15	103
WINDSOR A	ON	30	173	Apr 29	Oct 20	31	Apr 11	May 13	Sept 28	Nov 13	Apr 20	Oct 28	190	May 10	Oct 1	143
CHURCHILL A	MN	26	81	June 22	Sept 12	26	June 12	July 10	Aug 22	Sept 29	June 13	Sept 29	108	July 4	Aug 23	49
THE PAS A	MN	28	114	May 28	Sept 28	28	May 14	June 13	Sept 2	Oct 11	May 20	Oct 3	135	June 13	Sept 16	84
WINNIEPEG INT. A	MN	30	118	May 25	Sept 21	30	May 6	June 20	Sept 2	Oct 17	May 22	Oct 27	157	June 20	Sept 11	82
PRINCE ALBERT A	SK	28	93	June 5	Sept 7	28	May 12	June 24	Aug 11	Sept 21	May 17	Sept 5	110	June 6	Aug 12	66
REGINA A	SK	30	107	May 27	Sept 12	30	May 8	June 20	Aug 11	Oct 14	May 12	Sept 23	135	June 8	Aug 17	69
SASKATOON A	SK	30	110	May 27	Sept 15	30	May 6	June 17	Aug 19	Oct 8	May 8	Sept 29	143	June 7	Aug 19	72
CALGARY INT. A	AB	30	106	May 28	Sept 12	27	May 4	July 11	July 18	Oct 19	May 4	Oct 6	154	June 24	Aug 6	42
EDMONTON INT. A	AB	30	127	May 14	Sept 19	30	Apr 26	June 21	Sept 6	Oct 12	May 5	Oct 9	156	June 21	Sept 18	88
GRANDE PRAIRIE A	AB	29	113	May 19	Sept 10	29	May 3	June 17	Aug 15	Oct 7	May 15	Oct 7	144	June 17	Sept 6	80
MEDICINE HAT A	AB	30	125	May 17	Sept 20	27	Apr 26	June 12	Aug 27	Oct 19	Apr 30	Oct 14	166	May 30	Sept 5	97
ESTEVAN POINT	BC	30	224	Apr 5	Nov 18	48	Feb 4	May 10	Sept 24	Dec 30	Mar 4	Dec 30	300	Apr 30	Oct 18	170
KAMLOOPS A	BC	20	145	May 5	Sept 28	20	Apr 21	May 18	Sept 12	Oct 19	May 2	Oct 19	149	May 18	Sept 12	116
KIMBERLEY A	BC	26	95	June 2	Sept 4	26	May 10	July 7	July 18	Sept 30	Apr 26	Sept 19	148	July 3	Sept 18	14
LYTTON	BC	19	187	Apr 24	Oct 28	19	Apr 7	May 7	Oct 4	Nov 23	Apr 18	Nov 3	206	June 1	Oct 4	133
PENTICTON A	BC	30	143	May 10	Oct 1	30	Apr 22	June 13	Sept 12	Oct 19	Apr 27	Oct 17	172	June 13	Sept 13	91
PRINCE GEORGE A	BC	29	78	Apr 29	Nov 5	29	Mar 1	July 9	Aug 22	Oct 4	June 6	Oct 4	119	July 6	Aug 14	38
PRINCE RUPERT	BC	22	199	Apr 19	Nov 5	22	Mar 5	Apr 30	Sept 17	Dec 6	Mar 10	Nov 17	251	May 9	Oct 9	152
VANCOUVER INT. A	BC	30	212	Mar 31	Oct 30	33	Mar 5	Apr 30	Oct 2	Nov 28	Mar 24	Nov 26	246	Apr 23	Oct 2	161
VICTORIA INT. A	BC	30	202	Apr 13	Nov 2	31	Feb 25	May 6	Oct 10	Nov 28	Feb 25	Nov 20	267	Apr 25	Oct 10	167
DAWSON	YT	30	92	May 26	Aug 27	73	May 12	July 14	July 19	Sept 17	May 14	Sept 17	125	June 21	July 19	YT
ALERT	NT	29	87	June 5	Sept 1	37	May 13	July 4	July 30	Sept 20	May 13	Sept 17	126	July 4	July 30	25
COPPERMINE	NT	21	4	July 14	July 19	21	July 7	July 15	July 16	Aug 3	July 15	Aug 3	18	July 15	July 16	0
FORT SMITH A	NT	27	54	June 27	Aug 21	27	June 10	July 13	July 23	Sept 14	June 10	Sept 10	91	July 11	Aug 4	23
PROBISHER BAY A	NT	24	64	June 30	Aug 29	24	May 21	July 15	July 17	Sept 15	May 23	Sept 3	102	July 9	July 17	7
INUVIK A	NT	13	45	June 26	Aug 11	13	June 13	July 15	July 19	Sept 17	June 19	Sept 17	89	July 8	July 19	10
YELLOWKNIFE A	NT	29	108	May 30	Sept 16	29	May 6	June 12	Sept 2	Oct 5	May 6	Sept 26	89	July 13	July 28	12

NOTE: These dates refer to the occurrence of a minimum temperature of 0°C or lower in a thermometer shelter 4-1/2 feet (1.37 m) above the ground.

REMARQUE: Il s'agit des dates où la température minimale était ≤ 0°C sous abri 4-1/2 pieds (1.37 m) au-dessus du sol.

**AVERAGE MONTHLY AND TOTAL ANNUAL DURATION OF BRIGHT SUNSHINE IN HOURS**  
**MOYENNES MENSUELLES ET TOTAL ANNUEL DE LA DURÉE D'INSOLATION EFFECTIVE EN HEURES**

Station		Jan. Janv.	Feb. Fev.	March Mars	April Avril	May Mai	June Juin	July Juil.	Aug. Août	Sept. Sept.	Oct. Oct.	Nov. Nov.	Dec. Déc.	Annual Annuelle
GANDER INT. A	NF	73	85	102	116	155	169	202	180	145	112	62	60	1461
GOOSE A	NF	88	119	141	147	179	194	212	205	143	102	71	73	1674
ST. JOHN'S A	NF	64	76	89	116	158	188	213	184	145	111	62	52	1458
CHARLOTTETOWN CDA	PEI	83	105	137	156	199	215	244	220	180	133	72	59	1803
ANNAPOLIS ROYAL	NS	62	86	139	156	206	205	236	219	177	141	74	52	1753
SHEARWATER A	NS	110	129	148	176	217	217	220	214	172	155	98	90	1946
SYDNEY A	NS	81	106	126	161	204	222	251	225	168	139	74	67	1824
YARMOUTH A	NS	71	94	136	173	229	209	202	201	168	146	85	58	1772
CHATHAM A	NB	110	121	148	180	211	226	2552	235	181	144	91	96	1998
FREDERICTON CDA	NB	103	118	141	160	201	203	3424	218	166	140	85	91	1860
MONCTON A	NB	103	120	135	168	212	226	7	223	166	141	87	90	1918
SAINT JOHN A	NB	99	118	143	160	202	199	218	204	163	138	87	88	1819
LENNOXVILLE CDA	QC	79	102	135	162	212	229	256	229	166	135	67	60	1832
MONTREAL MCGILL	QC	93	109	156	171	220	241	264	238	180	140	70	77	1959
QUEBEC	QC	81	99	139	163	198	196	233	208	167	126	63	65	1708
SCHEFFERVILLE A	QC	82	117	165	191	168	198	188	145	101	67	45	61	1528
SEPT-ÎLES A	QC	103	135	163	222	232	248	253	219	166	125	88	97	2051
HARROW	ON	77	97	126	162	229	247	277	258	191	163	82	71	1980
KAPUSKASING CDA	ON	76	104	143	165	190	215	233	203	122	92	40	52	1635
LONDON A	ON	69	96	128	170	233	243	274	253	177	153	73	61	1930
NEW LISKEARD	ON	72	103	153	168	176	166	233	204	134	97	46	50	1602
NORTH BAY A	ON	97	130	158	188	231	246	267	226	158	115	59	70	1945
OTTAWA INT. A	ON	96	115	150	175	231	245	277	243	171	138	76	78	1995
THUNDER BAY A	ON	116	149	185	205	235	258	302	251	173	116	80	92	2162
TORONTO	ON	87	110	145	179	221	256	281	257	197	153	82	77	2045
CHURCHILL A	MN	78	130	183	196	182	234	285	234	104	63	45	55	1789
THE PAS A	MN	103	129	172	217	277	263	301	246	147	120	63	70	2108
WINNIPEG INT. A	MN	112	139	170	209	246	259	331	276	183	158	81	86	2230
PRINCE ALBERT A	SK	94	115	168	212	259	258	303	269	170	143	80	72	2143
REGINA A	SK	98	117	156	210	271	253	337	293	194	169	96	83	2277
SASKATOON	SK	99	129	192	225	279	280	341	294	207	175	98	84	2403
CALGARY INT. A	AB	99	121	156	196	237	240	317	278	188	166	116	94	2208
EDMONTON IND. A	AB	91	113	176	224	272	265	306	269	185	161	105	80	2237
MEDICINE HAT A	AB	91	118	149	199	256	261	342	292	188	165	105	86	2170
ESTEVAN POINT	BC	58	83	132	159	217	217	241	190	166	108	69	50	1690
KAMLOOPS A	BC	54	93	150	187	245	244	308	275	194	121	63	43	1977
KIMBERLEY A	BC	31	109	183	181	276	242	346	307	182	146	89	32	2124
PRINCE GEORGE A	BC	54	89	139	187	255	256	279	245	158	104	60	39	1865
PRINCE RUPERT	BC	42	59	86	118	159	120	120	119	95	54	40	24	1036
VANCOUVER INT. A	BC	55	93	129	180	253	243	305	255	188	116	70	44	1931
VICTORIA GONZALES HTS.	BC	70	98	150	198	277	276	338	287	209	139	81	60	2183
WHITEHORSE A	YT	42	81	160	230	267	271	250	225	134	96	48	21	1825
COPPERMINE	NWT	5	75	154	220	226	289	305	194	69	46	12	0	1595
FORT SMITH A	NWT	60	110	175	235	283	302	299	261	125	90	47	30	2017
FROBISHER BAY A	NWT	35	88	181	234	183	165	210	143	78	59	43	16	1435
INUVIK A	NWT	9	68	173	254	289	366	314	208	110	53	19	0	1863
YELLOWKNIFE A	NWT	66	101	210	255	323	354	359	250	119	43	40	15	2135

Climatic data shown in this leaflet are for representative locations across Canada. For more complete data, reference should be made to the relevant publications of the Atmospheric Environment Service.

Les données climatiques présentées dans ce document sont celles de stations représentatives de tout le Canada. Pour plus de détails, se reporter aux publications pertinentes du Service de l'Environnement atmosphérique.

The regular data publications of the Service include the Canadian Weather Review, the Monthly Record of Meteorological Observations in Canada, the Monthly Bulletin of Canadian Upper Air Data and a number of others. More complete normal data are to be found in such publications as the Climatic Summaries, Temperature and Precipitation Tables, Climatic Normals, Climatic Maps, and Climatic Data Sheets. As these are frequently revised reference should be made to "A selected list of Canadian Climatological publications" available free on application from the Assistant Deputy Minister, Atmospheric Environment Service, Department of the Environment, 4905 Dufferin Street, Downsview, Ontario, M3H 5T4.

Le Service publie régulièrement: la Revue du temps au Canada, le Monthly Record of Meteorological Observations in Canada, le Monthly Bulletin of Canadian Upper Air Data et un certain nombre d'autres documents. On trouvera des données plus détaillées sur les normales dans les publications comme les sommaires climatiques, les tableaux des températures et des précipitations, les normales climatiques, les cartes climatiques et les feuillets de données climatiques. Ces publications sont révisées fréquemment. Il faut donc se reporter à la "Liste sélectionnée de publications climatologiques", qu'on peut obtenir gratuitement en s'adressant au Sous-ministre adjoint, Service de l'Environnement atmosphérique, Ministère de l'Environnement, 4905, rue Dufferin, Downsview (Ontario) M3H 5T4.

## Plan 6

### Climate Regions of Canada

Objectives: Students will:

1. map the climate regions of Canada.
2. plot representative climographs for stations from each climate region.
3. practice atlas and gazetteer skills.
4. plot the location of each station on the climate regions map.
5. develop a description of each region's climate based on the data shown on the representative climographs.
6. explain the characteristics of each region's climate.
7. work in cooperative groups to accomplish 5 and 6 above.

Materials: blank outline map of Canada 1:1; graph paper or blank climograph frames 1:1; climate statistics for selected stations - 1 representative station per climate region (see attached table of climatic data); atlases/text

Procedure:

1. Provide a general introduction to the exercise and its purposes.
2. Distribute the blank outline maps, statistics and graph paper or climograph frames.
3. Have students work individually to:
  - a. draw the boundaries of the climate regions of Canada, as defined in the text or atlas, on the map. Label each region with its name or provide a legend as desired. Title the map "Climate Regions of Canada".
  - b. use the atlases and gazetteers to locate each station and mark it on the map.
  - c. draw the climographs for each station for which statistics have been provided.
4. Form groups and reorganize seating so that students can work easily together. Pairs frequently work best in this exercise.
5. In groups, students:
  - a. develop a written description of each climate region including comment on the winter low and summer high temperature as well as the amount and distribution of precipitation.
  - b. develop a written explanation, based on previous study of climate controls or on new research, of the characteristics described in the first part of their response.

Assignment: Prepare a good copy of the written description and explanation to be handed in for grading. (Note: this may be either an individual hand-in after group discussion or a group report.)



## Plan 8

### Population Growth in Canada

1. a) Draw a graph of the population increases (in percentages) for each decade from 1851 - 1990 (use Table 3.1).
- b) Draw a graph of the ration of net migration to total growth (in percentages) from 1851 - 1986. (Use table 3.3)
- c) Explain the pattern of change that the graphs reveal.

TABLES

**LEGEND**

- not available
- not appropriate or not applicable
- nil or zero
- too small to be expressed

e estimate  
p preliminary  
r revised

(Certain tables may not add due to rounding)

3.1 TOTAL POPULATION GROWTH, CANADA, SELECTED YEARS, 1851-1990

Census year	Population No.	Increase during intercensal period		Average annual rate of population growth %
		No.	%	
1851	2,436.3	•••	•••	•••
1861	3,229.6	793,336	32.6	2.9
1871	3,689.3	459,624	14.2	1.3
1881	4,324.8	635,553	17.2	1.6
1891	4,833.2	508,429	11.8	1.1
1901	5,371.3	538,076	11.1	1.1
1911	7,206.6	1,835,328	34.2	3.0
1921	8,787.9	1,581,306	21.9	2.0
1931	10,376.8	1,588,837	18.1	1.7
1941	11,506.7	1,129,869	10.9	1.0
1951 <sup>1</sup>	14,009.4	2,502,774	21.8	1.7
1956	16,080.8	2,071,362	14.8	2.8
1961	18,238.2	2,157,456	13.4	2.5
1966	20,014.9	1,776,633	9.7	1.9
1971	21,568.3	1,553,431	7.8	1.5
1976	22,992.6	1,424,293	6.6	1.3
1981	24,343.2	1,350,577	5.9	1.1
1986	25,354.1	1,010,883	4.2	0.8
1990 <sup>2</sup>	263,602.6	•••	•••	•••

<sup>1</sup> Newfoundland included for the first time. Excluding Newfoundland, the increase would have been 2,141,358 or 18.6%.  
<sup>2</sup> Updated postcensal estimates

3.2 TOTAL POPULATION, CANADA AND PROVINCES, SELECTED YEARS, 1921-90 (THOUSANDS)

Year	Nfld.	PEI	NS	NB	Que.	Ont.	Man.	Sask.	Alta.	BC	YT	NWT	Canada
1921	—	88.6	523.8	387.9	2,360.5	2,933.7	610.1	757.5	588.5	524.6	4.1	8.1	8,787.4
1931	—	88.0	512.8	408.2	2,874.7	3,431.7	700.1	921.8	731.6	694.3	4.2	9.3	10,376.7
1941	—	95.0	578.0	457.4	3,331.3	3,787.7	729.7	896.0	796.2	817.8	5.0	12.0	11,506.7
1951	361.4	98.4	642.6	515.7	4,055.7	4,597.6	776.5	831.7	939.5	1,165.2	9.1	16.0	14,009.4
1956	415.1	99.3	694.7	554.6	4,528.4	5,404.9	850.0	880.7	1,123.1	1,398.5	12.2	19.3	16,080.8
1961	457.9	104.6	737.0	597.9	5,259.2	6,236.1	921.7	952.2	1,332.0	1,629.1	14.6	23.0	18,265.3
1966	493.4	108.5	756.0	616.8	5,780.8	6,960.9	963.1	955.4	1,463.2	1,873.7	14.4	28.7	20,014.9
1971	522.1	111.6	789.0	634.6	6,027.8	7,703.1	988.2	926.2	1,627.9	2,184.6	18.4	34.8	21,568.3
1976	557.7	118.2	828.6	677.3	6,234.5	8,264.5	1,021.5	921.3	1,838.0	2,466.6	21.8	42.6	22,992.6
1981	567.7	122.5	847.4	696.4	6,438.4	8,625.1	1,026.2	968.3	2,237.7	2,744.5	23.2	45.7	24,343.2
1986	568.3	126.6	873.2	710.4	6,540.3	9,113.5	1,071.2	1,010.2	2,375.3	2,889.2	23.5	52.2	25,354.1
1990 <sup>1</sup>	573.4	130.3	894.2	723.2	6,769.0	9,743.3	1,091.6	999.5	2,471.6	3,126.6	26.1	53.8	26,602.6

<sup>1</sup> Updated postcensal estimates.

D E M O G R A P H Y

3.3 COMPONENTS OF POPULATION GROWTH, CANADA<sup>1</sup>, 1851 - 1986

Period	Total population growth '000	Births '000	Deaths '000	Natural increase '000	Ratio of natural increase to total growth %	Immigration '000	Emigration <sup>2</sup> '000	Net migration '000	Ratio of net migration to total growth %	Population at the end of the Census period '000
1851-1861	793	1,281	670	611	77.0	352	170	182	23.0	3,230
1861-1871	460	1,370	760	610	132.6	260	410	-150	-32.6	3,689
1871-1881	636	1,480	790	490	108.5	350	404	-54	-8.5	4,325
1881-1891	508	1,524	870	654	128.7	680	826	-146	-28.7	4,833
1891-1901	538	1,548	880	668	124.2	250	380	-130	-24.2	5,371
1901-1911	1,835	1,925	900	1,025	55.9	1,550	740	810	44.1	7,207
1911-1921	1,581	2,340	1,070	1,270	80.3	1,400	1,089	311	19.7	8,788
1921-1931	1,589	2,420	1,060	1,360	85.5	1,200	970	230	14.5	10,377
1931-1941	1,130	2,294	1,072	1,222	108.1	149	241	-92	-8.1	11,507
1941-1951 <sup>3</sup>	2,503	3,212	1,220	1,992	92.3	548	382	166	7.7	14,009
1951-1956	2,071	2,106	633	1,473	71.1	793	185	598	28.9	16,081
1956-1961	2,157	2,362	687	1,675	77.7	760	378	482	22.3	18,238
1961-1966	1,777	2,249	731	1,518	85.4	539	280	259	14.6	20,015
1966-1971	1,553	1,856	766	1,090	70.2	890	427	463	29.8	21,568
1971-1976	1,424	1,758	823	934	65.6	841	352	489	34.4	22,993
1976-1981	1,288	1,820	842	978	75.9	588	278	310	24.1	24,343
1981-1986	1,011	1,873	885	988	97.7	500	235	264	26.1	25,354

<sup>1</sup> Includes Newfoundland since 1951.

<sup>2</sup> Emigration figures are estimated by the residual method

<sup>3</sup> Data on growth components shown for 1941-51 were obtained by including data for Newfoundland for 1949-50 and 1950-51 only.

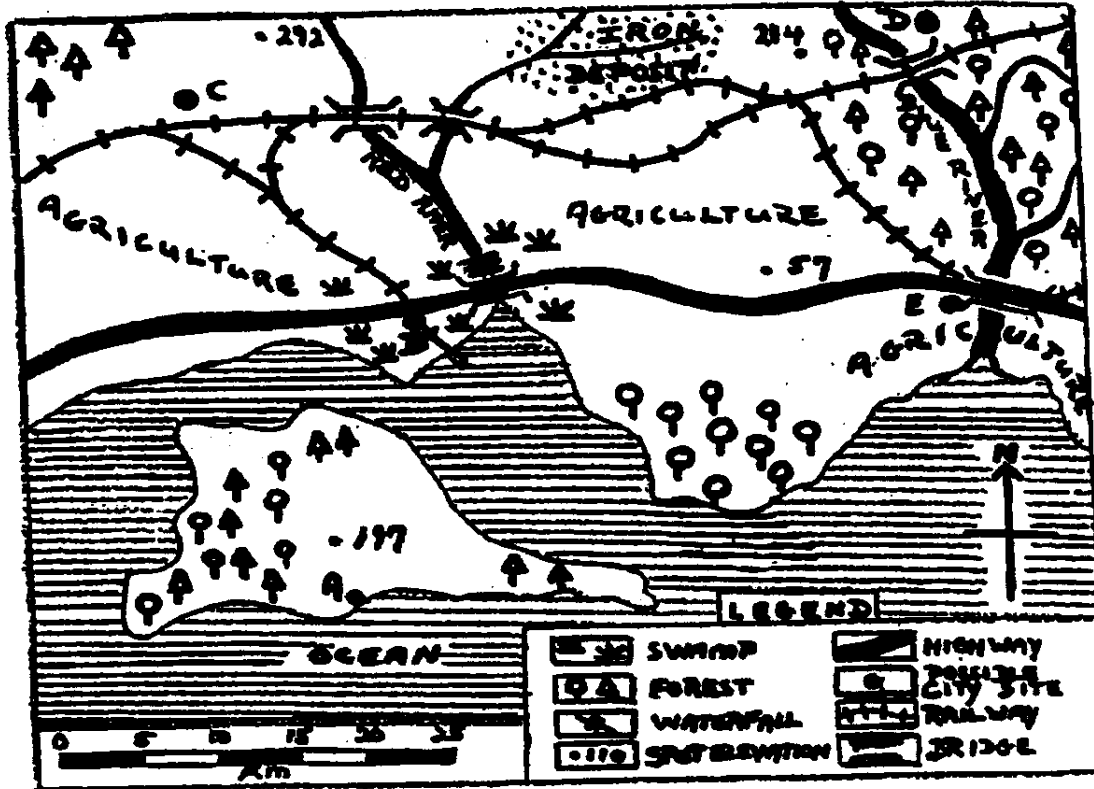
3.4 POPULATION OF CAPITAL CITIES, SELECTED CENSUS YEARS

City	1961	1971	1976	1981	1986
St. John's, NF.	63,633	88,102	86,576	83,770	96,216
Charlottetown, PEI	18,318	19,133	17,063	15,282	15,776
Halifax, NS	92,511	122,035	117,882	114,594	113,577
Fredericton, NB	19,683	24,254	45,248	43,723	44,352
Quebec, QC	171,979	186,088	177,082	166,474	164,580
Toronto, ON	672,407	712,786	633,318	599,217	612,289
Winnipeg, MN	265,429	246,246	460,874	564,473	594,551
Regina, SK	112,141	139,469	149,593	162,613	175,064
Edmonton, AB	281,027	438,152	461,361	532,246	573,982
Victoria, BC	54,941	61,761	62,551	64,379	66,303
Whitehorse, YT	5,031	11,217	13,311	14,814	15,199
Yellowknife, NWT	<sup>1</sup>	6,122	8,256	9,483	11,753
Ottawa, ON	268,206	302,341	304,462	296,163	300,763

<sup>1</sup> Incorporated after June 1, 1961.

## Plan 9

### City Locations



#### Objective:

To apply previously acquired knowledge of why cities are where they are by picking the best site for city growth from the map below then justifying the choice by reference to specific geographical factors.

#### Assignment:

Imagine that you are a town planner. You have been hired by the government to decide on the best location for a city. After some research, the choice of sites has been narrowed to the five on the map. Choose the site you consider to be the most favourable and list reasons for your decision. Explain why you rejected each of the other sites. Provide at least 3 reasons for each location's acceptance or rejection. Consider all the factors which influence city location that we have studied over the last few lessons.



## Plan 10

### Agriculture

See Table 2.1 Farms and Farmlands

1. What percentage of Canada was classified as Farmland in 1986?
2. What percentage of Canada was classified as improved Farmland in 1986?
3. What percentage of Canada was in crops in 1986?
4. What percentage of all farmland was in fallow woodland and other uses (combined) in 1986?
5. Suggest a reason for the large increase in cropland between 1901 and 1921.
6. What was the trend from 1901 - 1986:
  - a) in the number of farms?
  - b) in the size of farms?

See Table 2.3 Farms and Farmlands

1. What proportion of Canadian's improved farmland in 1986 was found in each of the following (see table 2.3)
  - a) Atlantic Region
  - b) Central
  - c) Prime
  - d) B.C.
2.
  - a) Express the number of farms in 1986 as a percentage of the number of farms in that region's peak year.
  - b) In which region was the decrease most marked?
  - c) State the peak year for each region.
  - d) What was the average percentage drop per year for each region since its peak year?
  - e) In which region was the decrease i) most rapid, ii) slowest?
3.
  - a) In which year was the farm size smallest in each of the regions?
  - b) In which year was the farm size largest in each of the regions?
4. For each region calculate what percentage of the land farmed in 1901 is farmed today. (Express the 1986 figure for improved farmland as a percentage of the 1901 figure)

5.
  - a) For each region state the highest percentage of its total land area that was ever farmed and give the year when that was reached.
  - b) Explain the large drop in Atlantic percentage in the 1941-1951 figures.
  - c) Compare the maximum percentages of farmland figures for each area and attempt to explain their differences. (paragraph form)

N.B. The figures used here could be updated from the Canadian Year Book or E. Stat CD Rom.

Table 2.1 Farms and Farmlands

	1901	1911	1921	1931	1941	1951	1961	1971	1986
<b>Canada</b>	<b>Millions of Acres</b>								
<b>Unimproved Farmland</b>									<b>2279</b>
<b>Cropland</b>	20.1	35.7	50.0	58.3	56.3	62.2	62.4	68.8	81.9
<b>Pasture</b>			7.6	8.0	8.5	10.0	10.2	10.2	8.8
<b>Summer Fallow</b>		2.5	12.0	17.0	23.5	22.0	28.2	26.7	21.0
<b>Other</b>			1.1	2.4	3.3	2.6	2.5	2.4	1.9
<b>Total</b>	20.1	38.2	70.7	85.7	91.6	96.8	103.3	108.1	113.6
<b>Unimproved Farmland</b>									
<b>Woodland</b>	16.8	17.5	23.8	26.6	22.3	22.8	17.2	11.5	
<b>Other</b>	16.5	42.8	46.3	50.7	59.7	54.4	51.9	50.0	
<b>Total</b>	33.3	60.3	70.1	77.3	82.0	77.2	69.1	61.5	
<b>Grand Total</b>	53.4	98.5	140.8	163.0	173.6	174.0	172.4	169.6	113.6
<b>Number of Farms</b>	511.1	682.8	711.1	708.6	732.9	623.1	480.9	366.1	293.1
<b>Average Size of farms</b>	124.2	159.5	198.1	223.9	236.7	279.4	358.7	463.3	571.8

Table 2.3 Farms and Farmlands by Region

	1901	1911	1921	1931	1941	1951	1961	1971	1986
<b>Number of Farms:</b>									
	<b>Thousands</b>								
Atlantic	105.2	104.4	97.8	86.3	77.1	63.7	33.4	17.1	11.3
Central	344.2	361.8	335.7	328.1	332.9	284.3	217.1	156.0	114.2
Prairie	55.2	199.2	255.7	288.1	296.5	248.7	210.4	174.7	148.5
British Columbia	6.5	17.0	22.0	26.1	26.4	26.4	19.9	18.4	19.0
<b>Average Size of Farms:</b>									
	<b>Acres</b>								
Atlantic	102.0	105.0	104.0	112.0	116.0	125.0	163.0	205.0	248.0
Central	104.0	104.0	119.0	122.0	122.0	132.0	151.0	172.0	201.0
Prairie	279.0	289.0	344.0	381.0	405.0	498.0	617.0	765.0	915.0
British Columbia	230.0	150.0	130.0	136.0	153.0	178.0	226.0	316.0	314.0
<b>Improved Farmland:</b>									
Atlantic	3,393.0	3,471.0	3,128.0	2,941.0	2,785.0	2,343.0	1,832.0	1,387.0	1,287.0
Central	20,706.0	21,815.0	22,324.0	22,267.0	22,426.0	21,522.0	19,897.0	17,314.0	15,401.0
Prairie	5,593.0	22,970.0	44,863.0	59,819.0	65,532.0	71,840.0	80,370.0	87,691.0	94,774.0
British Columbia	474.0	478.0	544.0	705.0	893.0	1,148.0	1,303.0	1,755.0	2,225.0
<b>Improved Farmland as a percentage of total land area:</b>									
	<b>Thousands of Acres</b>								
Atlantic	10.5	10.8	9.7	9.1	8.6	1.9	1.5	1.1	1.0
Central	5.8	6.1	3.4	4.1	3.9	3.8	3.6	3.1	2.7
Prairie	2.4	6.5	10.2	13.7	15.0	16.5	18.4	20.2	21.8
British Columbia	.2	.2	.2	.3	.4	.5	.6	.8	1.0

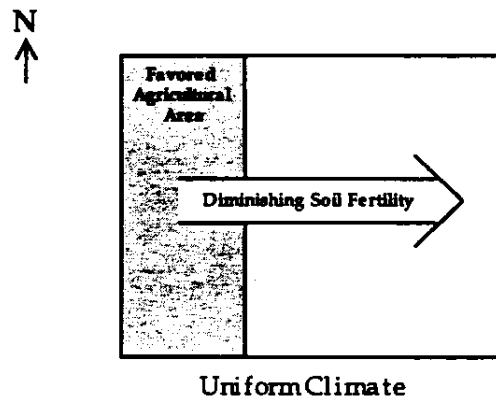
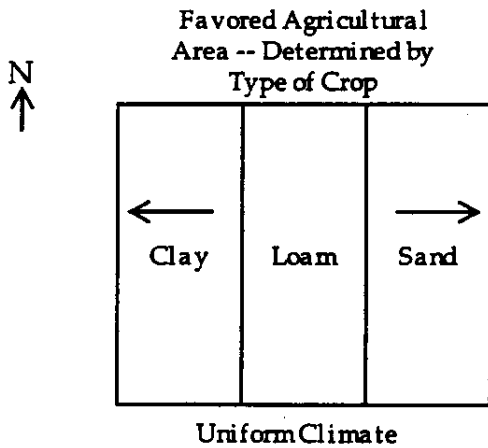
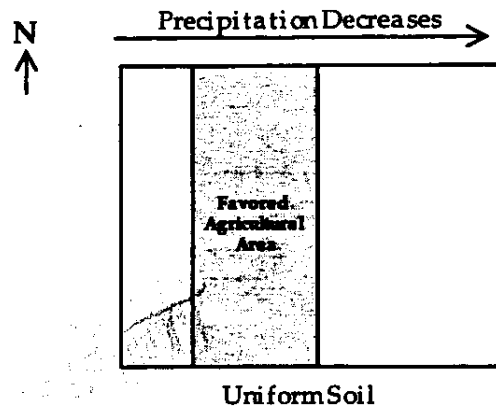
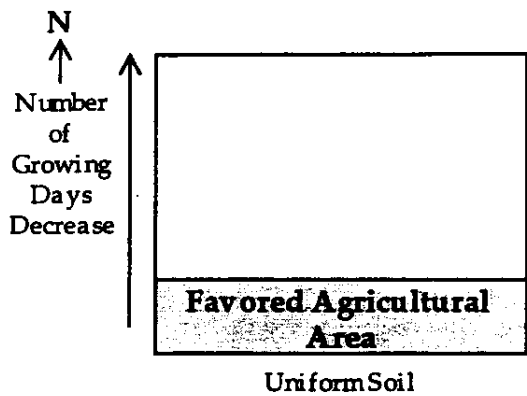
Plan 11

Agriculture in Canada - Influenced by Soil or Climate?

Which determines to a greater degree the extent of agricultural land in Canada, soil, or climate? Illustrate your answer with reference to specific regional examples.

This questions and its answer, may be used as the foundation for a discussion or debate on the factors influencing distribution and types of agriculture. Theoretical models may be used to demonstrate the influence of soil and climate, on agriculture, followed by an examination of the facts.

a) Example of Models



- b) Examine map showing agricultural land use in Canada.
- c) Examine maps showing soil and climate.
- d) Students map areas of agriculture.
- e) Define the following terms: Soil, Climate, Agriculture, Extent.
- f) The discussion should be regarded as more important than definitive conclusions. It is unlikely that the solutions to this question will be found in a text book - students should be able to write a conclusion which answers the question.

## Plan 12

### Fishing Exercise

- Q1) Draw proportional circles for the 1978 and 1989
- tonnage of fish caught,
  - value of fish caught.

Area	Tonnage - 1978	Tonnage - 1989	Value - 1978	Value - 1989
Atlantic	1,127,000	1,267,222	405,500,000	956,884,000
Pacific	199,000	122,847	252,000,000	70,960,000
Inland	49,000	45,507 (1986)	32,000,000	76,826,000 (1986)

#### Example:

- Atlantic tonnage - 1,127,000 tonnes
- radius of proportional circle =  $\sqrt{x}$  reduced to a scale.
- As all numbers are in 1000's it is possible to ignore the last 3 zero's and still keep the proportions the same.
- Therefore,  $\sqrt{1\ 127} - 34$  (rounded off). Using a scale which would be easy to fit on a piece of loose-leaf, let 34 be mm therefore  $r = 34$  mm.
- Repeat this for the other numbers, reducing the numbers to a manageable size before you calculate  $\sqrt{\quad}$  e.g., for value in the Atlantic area, calculate  $\sqrt{408.5}$ ,  $\sqrt{252}$  etc.

Q2) Draw divided circles (all equal in size) to compare the importance of the various types of fish caught on the Pacific and Atlantic coasts.

Atlantic

(Tonnage measured in 1000's)

Type of Fish	Tonnage 1978 (1000's)	Tonnage 1989 (1000's)	Value 1978 (\$M)	Value 1989 (\$M)
<b>1. Ground Fish</b>				
Cod	292	426	84	220
Flat fish	108	70	24	39
Haddock	43	26	18	25
Red fish	74	76	13	22
<b>All Ground Fish</b>	<b>602</b>	<b>685</b>	<b>159</b>	<b>359</b>
<b>2. Pelagic</b>				
Herring	244	229	42	32
Mackerel	25	21	4	5
<b>All Pelagic</b>	<b>309</b>	<b>356</b>	<b>67</b>	<b>86</b>
<b>3. Molluscs/Crustaceans</b>				
Lobsters	19	43	75	264
Scallops	109	92	63	93
<b>All Moll &amp; Crust</b>	<b>216</b>	<b>227</b>	<b>176</b>	<b>500</b>
<b>TOTAL ATLANTIC COAST</b>	<b>1127</b>	<b>1267</b>	<b>409</b>	<b>957</b>

Draw a circle to represent the total Atlantic tonnage (circle therefore = 100% of tonnage). Calculate the percent of the circle in each fish type e.g., Cod -  $292/1,127 = 25.9\%$ . But a circle has  $360^\circ$  and the circle represents 100%.  $360^\circ = 100\%$   $3.6^\circ = 1\%$ . The proportion of the circle which represents cod is  $25.9 \times 3.6^\circ = 93^\circ$  (to the nearest degree).

Repeat this calculation for each fish type.



**\*Note:** To start the diagram

- 1) calculate the number of degrees for each group of fish types, ground fish, etc.
- 2) divide your circle into three sections - one for each group.
- 3) Sub-divide each section into the undivided fish types e.g., Cod would be a part of the ground fish section.
- 4) To complete the graphs color code your drawings using just three colors, one for each group.

Repeat the above for the Pacific Coast

Pacific

(Measured in thousands)

Type of Fish	Tonnage 1978 (1000's)	Tonnage 1989 (1000's)	Value 1978 (\$M)	Value 1989 (\$M)
<b>1. Ground Fish</b>				
Cod	65	9	2	5
Halibut	5	6	17	19
<b>All Ground Fish</b>	<b>33</b>	<b>123</b>	<b>26</b>	<b>71</b>
<b>2. Pelagic</b>				
Herring	81	41	57	76
Mackerel	71	89	158	220
<b>All Pelagic</b>	<b>158</b>	<b>133</b>	<b>218</b>	<b>298</b>
<b>3. All Moll uscs &amp; Crustaceans</b>	<b>85</b>	<b>16</b>	<b>8</b>	<b>42</b>
<b>TOTAL ATLANTIC COAST</b>	<b>276</b>	<b>272</b>	<b>252</b>	<b>411</b>

- Q3.** Write a paragraph for each series of graphs to:
- a) Describe the trends shown.
  - b) Attempt to explain their trends.

## Plan 13

### Forest Areas of Canada

1986

Name	Total km <sup>2</sup>
NFLD	225
NS	40
NB	63
PQ	825
ON	466
MAN	251

Name	Total km <sup>2</sup>
SASK	237
AB	378
BC	603
YUKON	274
NWT	614

- 1) Draw proportional circles for the total forested areas of each province. Note when drawing these circles arrange them in order largest to smallest. When calculating the radius, take the  $\sqrt{\quad}$  of each number, e.g., for NFLD the radius would be  $\sqrt{225} = 15$  mm.
- 2) For each circle mark on the proportion of the forest which is suitable for regular harvest using the following figures which are all in km<sup>2</sup> (000, s). (1986)

1986

Name	Total km <sup>2</sup>
NFLD	112
NS	39
NB	61
PQ	548
ON	383
MAN	149

Name	Total km <sup>2</sup>
SASK	159
AB	254
BC	511
YUKON	76
NWT	143

All above represent the areas suitable for harvest!

Example:

Suitable forest       $\frac{112}{225} \times 100 = 50\%$  (rounded off)  
Total Forest      225

$50 \times 3.6 = 180^\circ$  in circle

\* Note: If this number is very large subtract it from 360 and draw the smaller segment. Shade the area which represents timber suitable for harvest.

3. Using the following figures calculate:

- a) The value of each volume unit of wood for each province. List the provinces in descending order of value.
- b) The value of lumber for each inhabitant of each province. List the provinces in descending order of value.

Examples:

i) Value per unit volume =  $\frac{\text{Val } \$}{\text{Vol}}$

Value per inhabitant =  $\frac{\text{Val } \$}{\text{pop.}}$

- ii) Comment on the discrepancies between the two lists.

Volume of Lumber produced in m<sup>3</sup> for 1984. (000's)

Province	Volume
NFLD	89
NS	460
NB	1 066
PQ	8 852
ON	4 559
MN	138
SK	520
AB	2 683
BC	30 861

Volume of Lumber produced 1984. (000's)

<b>Province</b>	<b>Volume</b>
NFLD	9 174
NS	60 234
NB	185 351
PQ	1 328 637
ON	669 101
MN	23 558
SK	51 937
AB	269 376
BC	3 665 698

Population by province 1986 (000's)

<b>Province</b>	<b>Volume</b>
NFLD	568
NS	873
NB	710
PQ	6 540
ON	9 114
MN	1 071
SK	1 010
AB	2 375
BC	2 889

N.B. The figures can be updated from the Canada Year Book or the E-Stat CD Rom.

## Plan 14

### Factors Affecting Industrial Location: Case Studies

Note that this is intended as an introductory activity on industrial location.

Objectives: Students will:

1. analyze written material to isolate and explain factors affecting where industry locates.
2. compare the relative advantages and disadvantages for industry of several locations in Canada at present and for the future.

Materials:

Required resource materials include:

Ann Walmsley, "Bright Lights, Best Cities", pp. 42-55 and "Cities to Watch", pp. 56-58, The Globe and Mail Report on Business Magazine, August, 1992; blank outline maps of Canada; atlases

Supplemental materials might include:

Giles Gherson, "N.B. Means Business", Readers Digest, December, 1992, pp. 103-108. (Condensed from the Financial Times of Canada.)

Giles Gherson, "Overhauling New Brunswick", Financial Times, July 6, 1992, pp. 1, 8-10.

Alexander Bruce, "Renaissance City", Commercial News: Atlantic Canada's Business Journal, November, 1992, pp. 14-28.

Harry Bruce, "Canada Journal: Moncton, New Brunswick", Equinox, November/December 1990, pp. 97-114.

Procedure:

1. Provide copies of the article or articles.
2. Have students read the material while keeping notes on the things which seem to matter to businesses when they are considering a place to locate.
3. Have students compile a list of the key factors which appear to influence industrial location. Discuss student findings with the whole class encouraging students to hypothesize about why the factors identified would be significant. Develop a brief list of "Factors Affecting Industrial Location" from this.
4. Distribute base maps and atlases. Have students use the atlases to locate and map each city discussed in the reading.
5. Based on the materials about each place in the reading, have students hypothesize about the advantages and disadvantages of each area for industry. Discuss which are better for different types of industry and which show the most promise for the future.

Assignment: Write a brief summary indicating the factors which most affect industrial location in Canada and describe and explain the strengths and weaknesses of each region with respect to potential industrial development.

**Bright Lights**  **Best Cities**

Taken From:

**REPORT ON BUSINESS MAGAZINE  
AUGUST 1992**

**A Special Report Prepared By  
ANN WALMSLEY**

*Our first annual survey of Canada's top towns for business. The criteria:  
skilled workers, low land costs and proximity to markets. And nearby  
fishing and ski spots don't hurt.*

With the recession still refusing to go away, it is not surprising that companies are eyeing cities where labour and other operating costs are moderate. But when *Report on Business Magazine* set out to discover which Canadian cities are the best for business in 1992, we learned that low costs alone don't cut it. According to the dozens of industry associations, site location experts, economic development directors and company executives surveyed across the country, quality of life, pro-business attitude, a trainable workforce and handy transportation are the attributes that are making cities shine the brightest in the competitive '90's.

The top five cities that we chose — Moncton, Kelowna, Mississauga, Richmond and Calgary — demonstrated strong combinations of all those qualities. Moncton is perhaps the most remarkable with its stable, bilingual workforce and its new telemarketing infrastructure, which is winning praise from U.S. and Canadian observers alike. Kelowna and Richmond are turnaround towns enjoying explosive growth due to their spectacular locations and entrepreneurial activity. The five runners-up — London, Regina, Edmonton, Montreal and Ontario's "Technology Triangle" of Guelph, Kitchener-Waterloo and Cambridge — scored highly in some of those categories but not all. Notably absent from

the list is Toronto, Canada's financial centrifuge and the place many companies still feel they have to be to do business. Costs, whether for labour, housing or taxes are high there. And crime and the frenetic pace of life is taking its toll.

Like the trend in the United States for the past five years or so, smaller, "second-tier" Canadian cities are becoming attractive as the move to a service economy diminishes the need of companies to be physically close to major markets. Five of the 10 short-listed cities are second-tier urban centres. Moncton is following a pattern mapped out by the likes of Burlington, Iowa, Lawrence, Kan. and Phoenix, Ariz., which all learned to overcome the disadvantage of their locations by becoming leaders in advanced telecommunications that link companies with markets. One thing many smaller cities can capitalize on is quality of life, that elusive variable that can mean everything from good public school education to clean lakes to swim in. "If you are a modern manufacturer, your people are no longer just production workers, they must have analytical skills," says Jayson Myers, chief economist for the Canadian Manufacturers' Association. "A top city has to be attractive enough to appeal to that type of employee."

To narrow down the candidates, we measured each city's performance in

a number of other categories. They included:

- \* business starts and bankruptcies
- \* industrial land cost and availability
- \* labour conditions, ranging from work stoppages to access to skilled labour pools
- \* government support and assistance
- \* proximity to markets
- \* transportation advantages
- \* business costs, including utility, tax and wage rates

Our analysis also took into account a comparative cost study by The Boyd Company Inc., location consultants in Princeton, N.J., which examined the annual operating costs in 45 North American cities of a 100,000-square-foot light-manufacturing plant employing 125 hourly workers and shipping nine million kilograms of finished product to a national market. In that analysis, Vancouver, at \$9.6 million, was the second most expensive location on the continent after San José, Calif., the capital of Silicone Valley. Toronto place 13th at \$9 million. Montreal came in at \$8.6 million, Edmonton at \$8.4 million.

Although *Report on Business Magazine's* winners have a lot going for them, they cannot be all things to all companies. But they are where business and people are heading. And that's not wise to ignore. •



## A Developer's Dream

*Once Kelowna's Arizonalike splendour just lured retirees. But now it's becoming a hot location for high-techs*

Five years ago, people called you a hick if you set up a business in Kelowna," says Pat Montani, who sold his Toronto company and retired to the Okanagan Valley at the age of 41, only to find himself launching a software company in Kelowna a few months later. "But today it's in vogue to sit in a fishing boat and think through the business plan." The idea that quality of life enhances quality of thinking is turning this formerly sleepy wine- and juice-making and forest products community into a hot location for high technology enterprises. Montani used to fight traffic for three hours a day between Cambridge and Toronto to run his voice network management company. Today in Kelowna he bicycles to the office in 15 minutes, clocks three days a week and still expects to do \$20 million in sales during the next three years selling to blue-chip, international companies. Downtown he keeps bumping into other like-minded, 40-something retirees with capital and technical expertise to burn. "I have met more interesting, creative people here than in 15 years in Toronto," he says.

The overflowing talent pool is one of Kelowna's key attractions. Its population ballooned by 24% in

the past five years. And 5,000 more new residents are expected this year, attracted by a sunny, semi-arid climate with an annual average precipitation of 312 millimetres (12 inches) (compared with an average of 758 mm [30 in.] in our top five cities), trout-filled lakes and powder skiing at clubs where season's family passes go for only \$1,000. Most employees are so eager to stay that they pay what's known locally as "the sunshine tax"—lower wages in return for lower-cost, higher-quality lifestyle. Small retailers, for example, pay clerks only \$6.50 an hour. "If you can't find the employee you want locally, you'll have a dozen top candidates vying to move here," says Montani.



POPULATION 76,000  
(114,000 including suburbs)  
AVERAGE OFFICE LEASE  
COST \$6.80/sq. ft.  
AVERAGE MANUFACTURING  
WAGE \$10.50/hour  
AVERAGE CLERICAL WAGE  
\$11/hour  
MAXIMUM PROVINCIAL  
CORPORATE INCOME TAX  
RATE 15% (federal/ provincial  
combined: 43.8%)  
MAXIMUM PERSONAL  
INCOME TAX RATE: 51% of  
federal tax  
EXECUTIVE HOUSE PRICE  
\$195,800 (average price of a 2,200  
sq. ft. house with four bedrooms)  
UNEMPLOYMENT 12.5%

Serving the region's large retired population is still big business in

Kelowna, which boasts one of the highest assets-per-capita figures in the country. It's no surprise that the fastest-growing branches of Wood Gundy Inc. and other securities firms are here. But there's a nothing's impossible mood in the business community that is increasing the voltage in every sector. Western Star Trucks Inc. just won a \$200-million contract to build trucks for the Canadian military. Northside Steel Fabricators Ltd. staged a turnaround by selling metal containers to Boeing Co. for shipping airplane parts. Local wineries, sideswiped by the free trade agreement, saved their industry by replanting with new varieties of high-quality grapes. As for the city fathers, they have nothing if not guts. This spring, the Central Okanagan Economic Development Commission organized a bid for the bankrupt Florida-based Piper Aircraft Corp., in competition with a joint bid by Saskatchewan and Manitoba. One possible site for the facility is a former copper mine that is being redeveloped as a 40-acre industrial park. Whether or not it eventually houses Piper, land recycling is a clever solution to limited industrial space in the valley, much of which is protected by B.C.'s Agricultural Land Reserve.

The clincher for many relocating companies has been Okanagan College's new university program. Northern Airborne Tech-

nology Ltd., an avionics company in Prince George, B.C., was hunting in 1986 for a university town with a warmer climate to keep its highly trained employees happy. At that time, Kelowna's \$6 per square foot for oak-panelled office easily beat Vancouver's \$20. "But my priority was to know people could upgrade," says Northern president Walter Shawlee.

Kelowna is also a developer's dream. A new art gallery, library and courthouse are in the works and City Hall is expanding. Attracted by the Arizonalike splendour of the climate, Relax Hotels and Resorts Ltd. in a joint venture with British-based Forte Hotels Inc. is opening a hotel, convention centre and vacation home complex that resembles an upscale Palm Beach resort. Hong King-born developer Caleb Chan bought a local golf club and is planning a 540-unit residential complex around it. Chan, 40, whom *Newsweek* dubbed "an Oriental Rothschild," also owns a home in an exclusive gated community on Lake Okanagan. These walled communities with their condo-style bylaws are sprouting everywhere. And in a local twist, most seniors' communities include large paved areas for residents to park their RVs.

The black mark against B.C. interior cities has always been that you can't get them from here, at least not quickly. But the new four-lane Coquihalla Highway has slashed the

former six-hour drive from Kelowna to Vancouver to only four hours. A recent runway extension means Kelowna's airport can accommodate 747s. But so far connections link it only to Vancouver and Calgary. Montani and others grumble that travel to the United States still takes a full day.

One of the few limits to enterprise in this busy metropolis is the regional council's dictum that only clean industry need apply, an edict arising from the fear that smokestack factories could turn the ecologically fragile valley into a smog belt. Yet such restrictions make good business sense. Kelowna knows that if beauty is luring the companies it wants, allowing the city to be sullied will only scare them away.

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### Answering Moncton's Call

*Premier McKenna's  
salesmanship is transforming  
Moncton  
into the back-office capital of  
Canada*

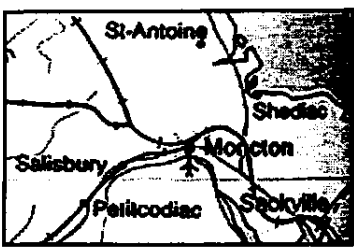
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In December, 1990, then president of Camco Inc. Stephen Snyder had already decided to centralize the appliance manufacturer's customer inquiry centres in Waterloo, Ont., when New Brunswick Premier Frank McKenna heard about Camco's site search and came calling. After a four-hour meeting with the Premier, Snyder had to admit that Moncton might be a better choice for the customer call

centre. Not only did the city offer a lower-cost bilingual labour force and unusually advanced telecommunications, but McKenna found a solution for every problem the company raised. The big surprise: When Camco crunched the numbers, it discovered an 800-number call from Vancouver to Moncton cost only pennies more than one from Vancouver to Waterloo. And a \$1.5-million relocation contribution from the New Brunswick government made the province's 11% provincial sales tax easier to endure. Within two weeks, phase one of the \$8.8-million operation was packing for the move to the eastern seaboard. The centre now operates from a gracefully restored, 1882 red-brick cotton mill in downtown Moncton.

In the past two years, several other national companies have found Moncton's telemarketing charms irresistible. CP Express and Transport Ltd. has 120 people working in its newly amalgamated national billing office there and Federal Express Ltd. has shifted its Eastern Canadian billing office from Toronto. Moncton's transformation from distribution hub of the have-not Maritimes to back-office capital of Canada has a lot to do with McKenna's focused industrial strategy and a crack economic development SWAT team. Corporate site location consultant John Boyd of The Boyd Company Inc. in Princeton, N.J., which re-

ceives hundreds of what he calls "puff and flakery" solicitations from cities and states every month, says Moncton sells itself honestly and has recently made several of his short lists. "Premier McKenna comes well armed with documentation," says Boyd. "He makes a very compelling case."



POPULATION 57,010  
(105,400 including suburbs)  
AVERAGE OFFICE LEASE  
COST \$9.50/sq. ft.  
AVERAGE MANUFACTURING  
WAGE \$10.50/hour  
AVERAGE CLERICAL WAGE  
\$9/hour  
MAXIMUM PROVINCIAL  
CORPORATE INCOME TAX  
RATE 17% (federal/ provincial  
combined: 45.8%)  
MAXIMUM PERSONAL  
INCOME TAX RATE: 60.2% of  
federal tax  
EXECUTIVE HOUSE PRICE  
\$133,000  
UNEMPLOYMENT 9.3%

The case hinges on Moncton's bilingual workforce — the largest and best-trained bilingual community outside Quebec, including Winnipeg. Many are graduates of one of the two area universities — the francophone Université de Moncton, historically a focal point for the province's Acadian community, and anglophone Mount Allison University in nearby Sackville. Graduates speaking unaccented French and English start at \$21,000 to \$25,000 — as much as \$5,000 less than in major Canadian centres.

Local companies claim that Acadians have a ferocious work ethic that results in a highly stable workforce. In the past year, only one of Camco's 29 start-up employees has left. (It received more than 800 applications for those jobs.) "A company that goes there can be a big fish in a small pond and recruit people knowing that turnover will be low," says Boyd.

The New Brunswick Telephone Co. Ltd. is the other drawing card. It was one of the first phone companies in Canada to offer calling number identification on customers' phones and the service will be available to every customer in the province by 1994 — ahead of other provinces which have been slower to roll out service beyond major urban centres. NBTel ran Canada's first commercial trial of integrated services digital networks (ISDN), which can support videophones and high-volume data communications. Those too will be available to everyone by 1994. Free telemarketing training is available from the phone company. And a recent sweetener: On April 1 the province repealed the provincial sales tax for 800-service customers, including Camco. Monctonians, who once clung to the rail lines for their livelihood, now realize that their future is in phone lines.

The city itself scores unspectacularly as a quality-of-life destination apart from its rock-bottom

house prices and the fact that its usually fog-free weather conditions make it a rare Atlantic Canada city where you can count on your plane landing. It is essentially a railway town on a plain with a utilitarian telecommunications tower dominating the landscape. "Tourists come to see the Tidal Bore (a.k.a. Reversing Falls), but, frankly, the muddy tidal flats are ugly," confesses Ellen Christensen, Camco's customer centre manager. But there's an upside: Many Monctonians can commute for the summer from their cottages just 20 minutes away on the warm salt waters of Northumberland Strait. Lobsters cost \$8.80 a kilogram. Sailing in the summer and curling the winter are big community pursuits. And downtown Moncton is slowly gaining some decorative charm. At considerable expense, the city dressed up Main Street with iron lampposts and red-brick sidewalks. And developers are restoring the city's 1926 vaudeville theatre and its gold-leaf architectural details to showcase live performances.

New arrivals appreciate a business community that lacks establishment cliques. Admittedly, New Brunswick's ubiquitous Irving family has a growing presence in Moncton, but doesn't control it. The recent re-election of Mayor Leopold Belliveau, the city's first Acadian mayor, is a sign that the city is embracing its English-French duality.

The local economy is diversifying in other ways. Cambridge, Ont.-based Com Dev Ltd. recently opened a plant in the city to manufacture sub-systems for passengers' aircraft telephones. Environmental engineering is growing rapidly in Moncton, buoyed recently by the Université de Moncton's discovery of a substitute for ozone-destroying CFC refrigerants. And other new industries have tapped into the grants and subsidized loans available from the federal Atlantic Canada Opportunities Agency. For now, though, the best ride in Moncton is on the telemarketing tidal bore.

### The Affordable Solution

*Where else can you sit on the edge of a Toronto-sized market yet incur only a fraction of the costs?*

The reason for business's love affair with Mississauga is straightforward: location, location, location. Where else can you situate your office or factory within 10 minutes of Canada's largest international airport, sit smack dab on giant Highway 401, border the Toronto market (as well as serve the rest of the 120-million people within a day's drive) and draw on the region's three-million-strong labour force, while paying about 55% of the taxes required in other Metro Toronto areas such as Etobicoke and Scarborough? And according to

one recent arrival, the pharmaceutical company Glaxo Canada Inc., which moved its head office from Etobicoke to a 61-acre site in Mississauga, the city has image. Companies such as Du Pont Canada, Inc., General Electric Canada Inc., Northern Telecom Ltd. and Syntex Inc. have clustered there, taking advantage of the ample affordable land to build head offices that are architectural flagships. Glaxo itself has just completed the first phase of a \$225-million aluminum and glass complex. "This area is Pill Hill North to the pharmaceutical industry and we are an industry leader," says David Brown, Glaxo's senior vice-president of corporate administration. "But also the city opened its arms to us."



<b>POPULATION</b>	463,000
<b>AVERAGE OFFICE LEASE COST</b>	\$14.25/sq. ft.
<b>AVERAGE MANUFACTURING WAGE</b>	\$10.90/hour
<b>AVERAGE CLERICAL WAGE</b>	\$11.70/hour
<b>MAXIMUM PROVINCIAL CORPORATE INCOME TAX RATE</b>	15.5% (federal/ provincial combined: 44.3%)
<b>MAXIMUM PERSONAL INCOME TAX RATE</b>	53.6% of federal tax
<b>EXECUTIVE HOUSE PRICE</b>	\$278,300
<b>UNEMPLOYMENT</b>	11.2%

By the city, he means Mayor Hazel McCallion. The crusty septuagenarian

is a fist-on mayor who has run Mississauga for 14 years and is relentless in the cause of fiscal restraint. Her city is virtually debt free and has \$130-million in uncommitted reserves — and McCallion intends to keep it that way. "We have a philosophy of pay as you go," says Don McFarlane, a Mississauga senior financial analyst. "If we don't have cash, we don't buy." McCallion's cost-cutting strategies include job attrition and implementing a user-pay policy for recreational programs. The happy result: In 1992, the city imposed no tax increase. In 1991, taxes squeaked up only 0.6%. And while the Mayor spends plenty of time courting international clients (there are about 90 Japanese companies in Mississauga), she also appears regularly to cut ribbons at mom-and-pop business openings. "We'll turn cartwheels to bring companies in," she says.

She also works hard to keep them one they arrive. Recognizing that transportation is a key reason why companies choose Mississauga, the city provides annual updates on the 10-year plan to identify when new infrastructure will relieve specific congestion problems, when major construction will affect traffic flows and when new services such as rapid-transit buses will come on stream. "We're great hand-holders now," says Jack Terrell, manager of marketing for economic development.

Ontario's recession has made Mississauga more affordable in recent months. Industrial and commercial land parcels are now a fraction of the price quoted even two years ago. Prestige high-exposure business parks that commanded \$700,000 to \$1 million are now asking \$400,000 to \$450,000 — and willing to settle for less. Unlike smaller cities, Mississauga also has plenty of land — 11,000 acres developed, 3,000 serviced and 5,000 unserved but designated.

Mississauga is a solution for expanding Toronto companies like Glaxo that outgrown their space and want to hold on to their highly trained employees when they move. "We did a computer plot of our existing employees' home locations and public transit," says Brown. "We also wanted to draw on Mississauga's local residents."

But Mississauga has long struggled with its identity. The 18-year-old city that begins at Toronto's western border is eight formerly separate towns stitched together by the encroachment of subdivisions and malls. Individual towns still guard their heritage jealously and businesses tend to identify themselves as being in Streetsville or Port Credit, rather than the umbrella municipality of Mississauga. For some time, the main common meeting place was a shopping mall — Square One, Ontario's largest shopping centre. But the Jones & Kirkland-

designed city hall, which opened in 1987, finally gave the city not only a focus but some funk, with its modern scaffolded clock tower, oddly reminiscent of a Florentine campanile, and eclectic surrounding complex of buildings. A downtown of sorts has sprung up around it, including a new YMCA and high-quality office and condominium towers. And the city fathers are raising funds to build a Living Arts Centre next to the municipal buildings and a new sports complex in the north end.

Although dominated by the car, Mississauga's endless subdivisions have attracted a relatively affluent, family-oriented population. Residential lots are large by Toronto-area standards — 50 by 120 feet — and children still play from yard to yard or swimming pool to swimming pool and can bicycle to the local park without crossing major thoroughfares. In one community, there are 144 baseball teams. And the city continues to invest in quality of life. It has purchased 160 relatively untouched acres along the Credit River that snakes through the city and has a 30-year plan to build gardens on the site. The wisdom of the suburban desire to tame nature can be debated, but Mississauga's decision to cultivate long-range thinking in both lifestyle and business amenities is making it a choice destination. •

## The Orient Express

*Asian investment has meant that Richmond, B.C., is no longer a poor cousin to Vancouver*

To be honest, Richmond, B.C., has a number of disadvantages for business. Its industrial land prices are as much as 50% lower than Vancouver's, but are still among the highest in the country. Its labour costs are also high, as tough resources unions set bench marks for other trades. And it has few Class A office buildings. But the island city bordering Vancouver at the mouth of the Fraser River possesses a combination of assets that other cities envy: an international airport, West Coast quality of life, great Asian connections and proximity to the U.S. West Coast market.



POPULATION 127,000  
 AVERAGE OFFICE LEASE COST \$12.92/sq. ft.  
 AVERAGE MANUFACTURING WAGE \$10/hour  
 AVERAGE CLERICAL WAGE \$11.33/hour  
 MAXIMUM PROVINCIAL CORPORATE INCOME TAX RATE 15% (federal/ provincial combined: 43.8%)  
 MAXIMUM PERSONAL INCOME TAX RATE: 51.9% of federal tax  
 EXECUTIVE HOUSE PRICE \$273,600  
 UNEMPLOYMENT 9.8%

While the rest of the country is still stalled by a painful recession, Rich-

mond has powered blithely along, buoyed by immigration of people and money from Hong Kong and Japan, and from such so-called "minnow" investors as Taiwan and South Korea. Business establishments grew by more than 250% in the past decade and employment grew at twice the regional rate. Asians make up 25% of Richmond's population, up from 14% in 1986. The influx is likely to continue, given that there are still five years left before Hong Kong reverts to mainland Chinese control. Don't even think of opening a Szechuan restaurant in Richmond, says local wisdom. You'd be lost in the crowd.

Richmond's success with the Asian community means it is no longer the poor cousin to Vancouver, nor reliant on its old staples of steel fabricating and lumber. Next June, Japanese retailing giant Yaohan Department Store Co. Ltd. will open its first Canadian department store in Richmond. President Asian Enterprises Inc., a subsidiary of a major Taiwanese food processor, is building a hotel and shopping complex complete with a Buddhist temple. And Hughes Aircraft of Canada Ltd. is expanding in Richmond after winning a \$400-million federal contract to upgrade Canada's air traffic control system in association with local avionics company MacDonald Dettwiler & Associates Ltd. Consumer electronics firms are chock-a-block. "Any-

body who's anybody in the consumer electronics industry has something going in Richmond," says Robert Farr, vice-president of sales and marketing for MTC Electronic Technology Co. Ltd., which moved to Richmond from Vancouver in 1988. Proximity to the airport is key for many in that field. Says Farr: "In our company, someone is flying to or from the Orient once a week."

According to at least one U.S. site selector, Richmond is soon likely to attract companies defecting from California. "California has some of the most onerous regulatory conditions in the United States," says John Boyd of The Boyd Company in Princeton, N.J. "And with the Los Angeles riots, the other shoe has dropped." A recent study by the B.C. government and accounting firm Price Waterhouse focusing on the high-growth electronics manufacturing sector found that total compensation costs for highly qualified workers are lower in British Columbia than California. Social insurance costs are only 2.4% of payroll in the Vancouver area, compared with 7.7% in the comparable city of San José, Calif., the capital of Silicone Valley. And worker compensation rates are 0.5% of gross pay compared with 2.5% in San José.

Despite all the activity and potential, Richmond is low-key about promoting itself to business. Economic development man-

ager Lino Siracusa does not seek out anchor companies or advertise success in landing them. And low-profile Asian money likes it that way. "Until a company's here and you have a nice opening, you don't read about it in the paper," says the new mayor, Greg Halsey-Brandt. He claims that the city itself knew nothing about the decision by Atsugi Nylon Industrial Corp. to build a \$200-million pantyhose manufacturing complex until after the company purchased the land. Atsugi has now put the project on hold due to hard times in the Japanese economy, though press reports have linked the decision to the Mayor's request that company provide day care for the children of its planned 1,400 workers.

Halsey-Brandt is adamant that he is pro-business only to the extent that a company respects the city's environmental and labour standards. He is proud of the fact that his city surpassed other contenders in May to win the federal government's Environmental Achievement Award for leadership by a municipality. Richmond's comprehensive environmental programs include blue boxes, composting, the reuse of gravel from recycled road concrete, the recovery of CFCs when refrigeration equipment is serviced and a program to encourage a switch to natural gas-fuelled cars. Richmond is also safe. So far, it has avoided the Asian gang

violence and drug problems that have plagued Vancouver, though the RCMP is battling incidents of Asian credit card fraud in Richmond. Lack of vandalism has always made Richmond popular among retailers. "In Richmond, people don't butt their cigarettes on the floor or spray graffiti on the walls," says Karen Marcellus, a general manager at the city's newest shopping centre, Richmond Centre. "It makes our investment better because the building lasts longer and looks better."

Although Vancouverites may look down their noses at Richmond, it rates highly with those who live there. Unlike Vancouver, which hugs the mountains, Richmond occupies a collection of boggy delta islands, and is diked with the odd results that it is at times below sea level. It receives more sun than Vancouver and provides a better vista on the mountains. Joggers are fond of running the dikes, and bird watchers frequent the Pacific flyway. Shoppers rhapsodize about being able to buy vegetables and berries fresh from farmers' stands in the city and to bargain for fresh fish at the Steveston wharf. "You could put a golf ball on my office roof and hit two golf courses," says Robert Farr enthusiastically. "It's a great place to live." •

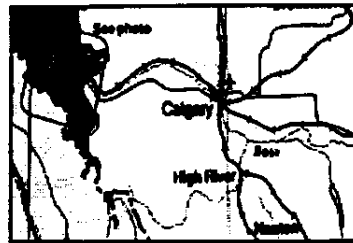
## Let the Games Continue

*Calgary's pride in hosting the 1988 Winter Olympics now fuels its emergence as a leading industrial centre*

When Westfair Foods Ltd. moved its head office from Winnipeg to Calgary to be more centrally located in its expanding Western Canadian market, it offered about 100 employees the chance to come along. Ninety people took the offer. Most companies would count themselves lucky to keep that percentage of people in a relocation from a downtown site to the suburbs in the same metropolitan area. But this is Calgary, looming like Oz and the end of the Prairies, the last stop before the Rockies in the only province that imposes no provincial sales tax. Among those willing to transfer with Westfair, which operates The Real Canadian Superstore chain, was Winnipeg-born David Ryzebol, the company's public affairs director. "There are some things I miss about Winnipeg, but Calgary is very dynamic and entrepreneurial," says Ryzebol. "And I still can't believe the view of the mountains every day when I drive to work. It's just so breathtaking."

Ryzebol is typical of Calgarians in his enthusiasm for this city. In an Angus Reid survey last fall, residents gave Calgary top marks in seven out of 12 categories including the economy, lack of stress,

social harmony and low crime rates. None of the other six Canadian cities polled received such high ratings from its citizens. "These people are in love with who they are, where they are the type of people they have attracted to their community," says John Wright, senior vice-president at Angus Reid Group in Toronto.



**POPULATION 710,700**  
**AVERAGE OFFICE LEASE COST \$10/sq. ft. (zero to \$4 subleased)**  
**AVERAGE MANUFACTURING WAGE \$10.41/hour**  
**AVERAGE CLERICAL WAGE \$10.86/hour**  
**MAXIMUM PROVINCIAL CORPORATE INCOME TAX RATE 15.5% (federal/provincial combined: 44.3%)**  
**MAXIMUM PERSONAL INCOME TAX RATE: 49.3% of federal tax**  
**EXECUTIVE HOUSE PRICE \$252,100**  
**UNEMPLOYMENT 10.8%**

Unlike the coastal cities to the west, Calgary's labour force has one of the lowest unionization rates of any major Canadian city (about 25%). Calgary boasts the highest concentration of people with post-secondary education (55%). And the percentage of people employed in the fields of science, engineering and mathematics (4.4%) is twice the national average. Those and other factors have prompted several recent head office relocations, luring H&R Block

Canada Inc. from Scarborough, Ont., and Agra Industries Ltd., and engineering and construction company, from Saskatoon, Sask. TransCanada PipeLine Ltd. expects to recover in five years the \$52 million it spent moving its head office from Toronto to Calgary in 1990 due to savings on rent, provincial capital tax and health plan payments.

Ten years ago, Calgary was not such a happy place. The recession in the early 1980s hit hardest there; 11,000 people left Calgary in 1983 alone. But when world oil prices collapsed again later in the decade, the city had already begun to diversify. In 1990, more than 11,000 people migrated to Calgary. And while major oil companies have handed out pink slips in the past 12 months, many employees used their severance packages to set up software, engineering and consulting firms. Calgary now has 181 specialty software companies among more than 500 advanced technology businesses.

The shrinkage in the energy sector has created positive conditions for other businesses moving in. Aerospace, biotechnology and electronics companies are hiring from the idled pool of highly skilled workers. Ottawa's Computing Devices Co. recently opened a manufacturing facility in Calgary to make communications systems for the Canadian military. Given the high office vacancy rate, if you can't get a phenomenal

deal on office space, you shouldn't be in charge of your company's real estate transactions. Class A space subleased from one major oil company in the Scotia Centre goes for about \$8.50 per square foot including taxes and maintenance. Excluding those operational costs, rent is a mere \$2 a square foot. And 40% of all office vacancies in Calgary at the moment are subleases.

Warehouse costing has also become aggressive, feeding Calgary's rise as the Western distribution mecca for many companies. As Nashville is to the United States, so Calgary is becoming to Western Canada. Duracell Canada Inc. moved its regional distribution centre from Winnipeg to Calgary, while Freightliner of Canada Ltd., a parts distributor for Mercedes-Benz, moved its Burnaby, B.C. operation there. Beaver Lumber Inc. recently amalgamated its Edmonton and Calgary offices in Calgary and, in September, will open its first western distribution centre there, which will eventually employ 500 people. "Truckers like the city," says Murray Bozniak, Beaver Lumber's president and CEO. "Driving downtown doesn't tie up a lot of time and it is right on the Trans-Canada Highway."

The 1988 Winter Olympics boosted the economy and brought the city to the attention of both tourists and investors from around the world.

"We are now lassoing some pretty big conventions that we wouldn't have gotten otherwise," says Chamber of Commerce general manager William Kaufmann. Rotary International will descend on the city in 1996, with its legendary convention throng of 25,000.

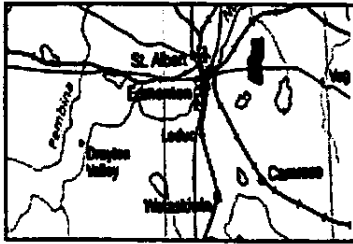
As part of the city's economic development strategy for the next decade, pro-business Calgary Mayor Al Cuerr has begun assembling city land for a new convention centre near the Calgary Stampede grounds. "It's the old Alice in Wonderland thing," says Mayor Duerr. "You can't get somewhere if you do not know where you are going." But then, in Calgary these days, things are looking pretty good in every direction. •



## Cities to Watch

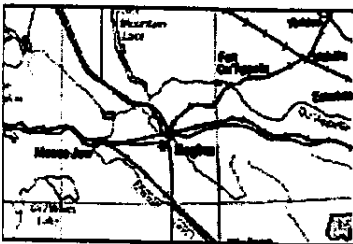
These contenders may surpass our top five in years to come

**EDMONTON** POPULATION 616,700



Like Calgary, Edmonton offers some of the lowest office occupancy costs in the country for a major city, with the added advantage of a lower cost of living than Calgary. It is the gateway to the major resource projects of northern Alberta. Diversification into biotechnology, advanced industrial materials and petro-chemicals has created economic and employment stability. Knowledge-based industries are growing there, drawing on a high concentration of university and other post-secondary programs. Cultural centres flourish: Celebrated director Robin Phillips heads The Citadel Theatre, and Andrew Lloyd Webber chose Edmonton for his Canadian premier of *Aspects of Love*. But while Edmonton's economic development authority gets high marks for aggressiveness, the city is still not as entrepreneurial a town as its long-standing rival to the south. Biggest drawbacks: limited air service and 19 different tax jurisdictions in the metropolitan area.

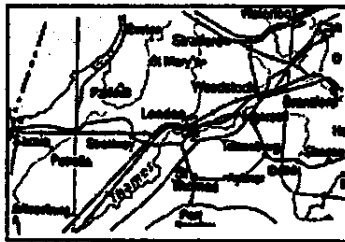
**REGINA** POPULATION 179,200



Wealthy Regina businessman Paul Hill plays a major role in attracting and stimulating business. He was instrumental in bringing the head office of Crown Life Insurance Co. to Regina and is behind the consortium bidding to buy Florida-based Piper Aircraft Corp. and

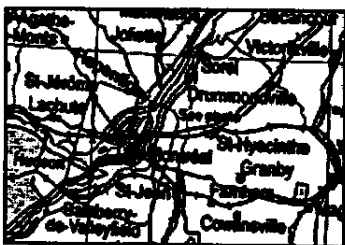
relocate it to Saskatchewan. Downtown Regina is a mass of building cranes — more jewels in the Hill empire. Unlike cities in many provinces, Regina can legally offer incentives. Newly arrived manufacturers and processors may receive business and realty tax abatement for up to five years depending on the number of employees and size of investment. The inducements may soon be applied to R & D spending as well. The average executive house price of \$157,400 is one of the lowest in our top ten cities. Biggest drawbacks: a regional market of only one million and a lingering dust-bowl image.

**LONDON** POPULATION 303,200



Business taxes are the lowest of any Ontario city with more than 100,000 people. London is the fifth-fastest-growing municipality among Canada's 25 largest cities, which fuels a thriving retail industry. Major head offices located here praise the wide range of skilled labour available and rapid access to both Detroit and Toronto via Highway 401. Continuing education degree courses offered in workplaces are fully enrolled and the University of Western Ontario's MBA program provides a steady flow of business talent. Actress Martha Henry presides over some of Canada's top theatrical talent as artistic director of The Grand Theatre. London is opening a convention centre in 1993. Biggest drawback: too far from Toronto's international airport.

**MONTREAL** POPULATION 1,017,700



Highly trained machinists and pharmaceutical chemists account

for some of Montreal's enviable skilled labour force — the machinists in the east and southwest end and the chemists in the west end. Aircraft parts manufacturer Dowty Group PLC chose Montreal over Salt Lake City, Utah, Fort Worth, Texas, Phoenix, Arizona and Bay County, Florida, for its generous provincial incentives and skilled labour in its recent decision to open a \$100-million plant to build Airbus landing assemblies. Land incentives are available - BABN Technologies Inc.'s new lottery ticket printing facility is one recent recipient. Several biotechnology research institutes and a top-flight medical school feed the dynamic pharmaceutical industry. Every facet of the arts sizzles in Montreal - in both languages. Biggest drawbacks: uncertainty about Quebec's political future within Canada and a high crime rate.

**THE TECHNOLOGY TRIANGLE:**  
CAMBRIDGE, KITCHENER-  
WATERLOO, GUELPH  
COMBINED POPULATION 420,300



These cities have forged an alliance to advertise their technically skilled work-forces, many of which were idled in the past three years by the departure of American branch plants. Excellent education programs tie into business — computer science at the University of Waterloo and agricultural science at University of Guelph. There are four advanced technology research institutes in the area. Guelph recently attracted the Royal Bank's data processing support centre, while Cambridge is home to satellite component manufacturer Com Dev Ltd. and to the lowest-defect auto-assembly plant in North America operated by Toyota Motor Corp. The triangle boasts the largest number of manufacturing facilities per capita in Canada and among the lowest unionization rates. Biggest drawbacks: All four towns are becoming bedroom communities for Toronto, which may drive up property tax unless industrial expansion keeps pace.

## Plan 15

Topic: Locating Industry in the Atlantic Region: A Simulation for the Auto Industry.

*Note that this is intended as a summative activity on industrial location.*

Objectives: Students will:

1. work in cooperative groups.
2. review the factors influencing industrial location generally and specifically for the auto industry.
3. use atlas thematic maps to gather data about possible sites in Atlantic Canada for establishing an auto assembly plant.
4. select 3 possible plant sites and rank-order them based on locational advantages.
5. role play various interest groups as they debate the final selection of a plant site.
6. select 1 site for the auto assembly plant and write a brief group report justifying their choice.
7. present their conclusions to the class and discuss and defend them in light of the other groups' opinions.

Materials: Countdown Canada 1:1; atlases 1:1; texts; overhead transparency of procedures for the lesson (master included); overhead transparency detailing roles for procedure 5 (master included); copies of "Volvo in Halifax: A study in location, transportation and human input" 1:1.

Procedure:

1. Divide the class into groups of 6 or 7. Have the students rearrange their seats as appropriate and collect atlases and copies of Countdown Canada for the group.
2. Use the overhead transparency "Industrial Location Exercise", explain the procedure to the class. Point out that Countdown Canada and the text will prove useful for the first task. Atlases will be needed for the second.
3. Allow an appropriate amount of time for the groups to complete the first 3 parts of their task.
4. As the groups finish the first tasks, use the second transparency to assign roles to the members of each group. Instruct them that they are to represent these

special interests, as real lobbyists might, to the best of their ability in the final site selection. Discuss what each special interest group might be most concerned with in such a situation.

5. Each group proceeds to select one final site on the basis of consensus if possible and majority vote if not.
6. Each group presents its decision to the class. Students must defend their choice of site in light of the selections made by the other groups.

Alternately, each group could be required to submit a written report. Time would have to be allowed for this to be produced. Each student in the group should be asked to sign the group's report to signify agreement with its contents. If a student finds they cannot agree with the submission, they should be allowed to submit an individual, minority report. The lesson objectives are still accomplished and problems related to group marking are avoided.

7. Finally distribute copies of the Volvo article and have students read it. While reading have them note the reasons for locating in Halifax given and compare them to their own reasoning. Discuss the differences and similarities.

## Industrial Location Exercise

PROBLEM: Where in Atlantic Canada would be the best place to locate an auto assembly plant?

PROCEDURE:

1. Consult resource materials, notes and texts to decide what an auto assembly plant needs to be successful.
2. Use the atlases and your general knowledge to select 3 possible sites for the auto assembly plant.
3. Rank-order the sites selected from best to worst based on your knowledge of the locational factors present in each place.

ROLES AS REPRESENTATIVES OF SPECIAL INTEREST GROUPS WILL BE  
ASSIGNED AT THIS POINT:

4. Each group member will take a role from the list of special interests and represent that point of view in discussions about the final choice of site for the auto assembly plant.
5. As a group, settle on a site for the plant to be built. State your reasons in light of the locational factors and the arguments of the special interest groups. Prepare an oral presentation of the foregoing.

## SPECIAL INTEREST GROUPS

These people would try to influence any site selection according to their own special requirements as noted below.

GROUPS	SPECIAL INTERESTS
Bankers	<ul style="list-style-type: none"><li>• security of loans to industry</li></ul>
Provincial Government	<ul style="list-style-type: none"><li>• relieving unemployment, especially in high unemployment areas</li><li>• getting votes</li></ul>
Investors	<ul style="list-style-type: none"><li>• making a healthy profit</li></ul>
Environmentalists	<ul style="list-style-type: none"><li>• preventing pollution of all kinds (air, water, noise, sight)</li></ul>
Industrialists	<ul style="list-style-type: none"><li>• making profits</li><li>• success of the industry</li></ul>
Community Groups	<ul style="list-style-type: none"><li>• jobs</li><li>• quality of life locally</li></ul>
Unions	<ul style="list-style-type: none"><li>• job security and conditions</li><li>• local pro-union environment</li><li>• quality of life for their workers</li></ul>

# Volvo in Halifax:

## A study in location, transportation and human input

An interview with Gunnar Jennegren, Vice-President and General Plant Manager for the Manufacturing Division of Volvo Canada Ltd.

**E**arly in 1962, Volvo began considering the establishment of a plant in Canada in order to maintain the Canadian sales pace. In 1963, negotiations were completed with the Government of Nova Scotia and Volvo became the first European car manufacturer to establish an assembly operation in North America when production commenced at Dartmouth, N.S.

In November 1987, Volvo Canada Ltd. moved to a new 135,000 sq. ft. plant on a 16-acre site in the Bayers Lake Industrial Park. At this new plant, Volvo 740 sedans and wagons are assembled for the North American markets. About 60 percent of Volvos sold in Canada are assembled in Canada with the remaining portion imported. The company is a domestic manufacturer and therefore participates in the Automotive Products Trade Agreement.

- Bengt Lundberg, President and CEO of Volvo Canada Ltd.

**WOW:** What made you want to assemble cars in Canada and why Halifax instead of high volume sales centres like Vancouver, Toronto, or even Hamilton?

**JENNEGREN:** We had an opportunity to come under the umbrella of the Auto Pact. We have a special agreement with the Canadian government whereby with a certain percentage of parts being Canadian content and the car's being built in Canada, we could import the rest of the components duty-free. A certain number of annual Canadian sales must be maintained and any future growth must include 40 percent Canadian content.

From the transportation side, we had to be as close to Sweden and the rest of Europe as possible because that is where most of the parts are coming from. Location near a port that was open all year was key because we are totally dependent on the container ships bringing a regular supply of parts year round. That's vital when you have to deal with nearly 10,000 parts for every car.

In emergency situations, when you need something quickly, you can fly it in so proximity to a good size airport becomes very important.

The reason why we didn't go down the St. Lawrence River is primarily because the river is not open year round but also because the transportation costs for the kit (when the cars are received in Canada, the body is already mounted on the frame and everything else is added on here) are much greater than the transportation costs for the complete, finished product. If we were to locate in a place like Kingston, Ont., we would not only be faced with higher costs for taking the kit farther, but we would also have to add transportation costs for the parts. Shipping the finished car is cheaper when you take these other things into account.

The shipping was the key part, but for distribution purposes we also had to have access to the other transportation routes like rail and roads, so St. John's Nfld., wasn't as attractive. And finally, there's the support, labour and opportunity in a certain area. When we started there was no financial support, other than a tax agreement, from any government but we felt there was tremendous growth opportunity in the Halifax area. It was a sound business opportunity to come to this area and build cars.

**WOW:** But labour is a variable you couldn't possibly judge before coming into the area.

**JENNEGREN:** No, but you can hire people, provide them with a good working environment and teach them. We started to assemble cars in Canada in 1963 and this is the third plant we've built since we arrived.

In 1967, having outgrown the first facility, we moved into a new plant right by the harbour where we built Volvo 240s for the Canadian market. That plant was built for a capacity of 5,000 to 7,000 cars per year, but at certain periods we were building cars at a rate of almost 13,000 per year. Toward the end of our stay, a portion of our production was going to the United States.

The present plant came into discussion in 1984 when the new 740 series was announced. When the volume sales of that series started to increase in Canada, we saw that it was time to start to assemble the car here. In 1986, we analyzed things like design concept, and requirements for equipment, tooling and space, and decided the best way to go was to build a new plant. Our capacity here is 8,000 cars but we are only working with one shift, so production can be increased. With some

restructuring, we can bring capacity up to 20,000 per year.

We like to say that in the second plant we were building the car in the basement. Racks were high, workspaces were narrow and the workers couldn't see each other.

At this plant, it's more like being on the ground floor than in the basement. You will see much more light where it's needed, more space, specifically designed work stations where the workers have all the material they need for the day, and they can see out the many windows and see how the weather is. Plus we have a long cycle. The people here do the same job only 36 times per day, not 60 times per hour like at the big manufacturers' plants.

In order to build good quality, with good people, you want them to see what they are doing and also to have a better atmosphere: to see each other and work together. Many will say that isn't important, but it is because we learn so much from each other. You can work with the same people, educate them and train them, and you can go further and further and become more competitive. We have been in Canada for 27 years and the average seniority of the workers is 18 years. We have one of the lowest turnover rates in the world.

So, we provided good facilities and the workers put into every car their own heart, capability and experience to build the car right. As a group, they are responsible for quality. They make sure that when the car leaves each station, it's correct and when the car leaves the line, they can be sure that they have attained the goals of the best quality.

We built this plant brand new in 1987. None of the workers had ever worked on the 740s so they came in here and started to build a car they were unfamiliar with. By the end of 1988, we had exceeded our personal goals for quality. And in 1989, we had a better quality rating than the other plants which had been building the car for three years.

**WOW:** That "human" philosophy differs from that of certain other manufacturers who apparently think automation is the way to go because robots can build better quality more consistently than people can.

**JENNEGREN:** You need a little of both. Some jobs are better done by robots. We have one robot (75 percent of which is built in Canada) which puts polyurethane on the edge of glass as a sealing material. That material is in such shape that it would not be feasible for the job to be done by human hand. We can provide the robot with a windshield, rear window, side winder or quarter panel and its puts the sealing material on perfectly, every time. A working, working with whatever type of tool could not do as good a job. In this case, the quality can only be achieved using a robot.

But when you go to another area, say making the seats, a person can do a much better job than a robot. A worker can pick something up, turn it, put it down, change the position and fasten it much better, and maybe quicker, than a robot could. A robot cannot correct itself because it doesn't learn. It can do the same job forever, but if it does one wrong, it can't fix it.

**WOW:** How many workers do you employ?

**JENNEGREN:** We employ 180 workers in the plant, but then you have to consider other jobs created by our being here. The container ships come into the harbour loaded with various things, our cars and parts, flats are unloaded by forklift at the same time as other forklifts load other cargo onto the ships and they go. The container ships only spend about eight hours in port. They are constantly moving. We couldn't operate here if we didn't have that kind of service and the ships couldn't come here if they didn't have that kind of cargo. So by being here, the value is great for the area because the service, backup, transportation and supply workers needed creates many more jobs for the Halifax area.

**WOW:** Do you foresee remaining in the Halifax area for a long time?

**JENNEGREN:** Who can say? We are in an internationally competitive opportunity and it's this international competition which is so vital for maintaining jobs and market share. Whatever happens in the future depends on how competitive we can continue to be on an international basis, not just a Canadian or North American basis. The future depends on how competitive we can be with the other Volvo plants in Europe, and there are many factors to consider. You have currencies, different costs for labour, productivity, absenteeism and turnover problems (people leaving for other jobs). Right now we are very competitive on the labour side, but it costs us extra with freight, distribution costs (taking the cars from where you're building them to where your customers are) and economics in general.

# Combatting Sou'wester Syndrome

by Kim Evans

Many textbooks still ignore or stereotype the Maritimes. It often appears from them that every Maritimer wears a sou'wester and has a dory moored nearby. The region is still frequently characterized solely in terms of unemployment, deprivation and backwardness. This incomplete picture, presented regularly to students, perpetuates a negative self-image which contributes to the area's continuing real problems: indeed, the self-image may be a kind of self-fulfilling prophecy. Such negativism must be countered with a more balanced and accurate view not readily available in the standard texts. There are many positive things to be said about the Maritimes and professional educators owe it to their students to seek out materials which do this. Promoting a more balanced and accurate view would improve our student's Maritime self-image and this, surely, should be a goal for all social studies teachers in the region.

How can new and fairer materials be obtained within the framework of shrinking budgets? Why not exploit home-grown primary resources? Such materials are found in every Maritime newspaper and magazine, most of which are also in your school or local library. Certainly, they are more readily available than comprehensive texts with a Maritime point of view! They are also up-to-date, and perhaps most importantly, they are relatively easy to use.

The "News of the Port", a regular feature in the *Saint John Telegraph-Journal*, provides a good example of the type of material available to implement

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the regional resources approach. The feature lists basic information on activities in the port. Ships' names, dates of arrival and cargoes, including origins and destinations, are usually included. This information is usable at almost all levels and may be applied equally well to local studies, Maritime studies, history, geography or economics.

## MAR. 10

Naseborg, to import caustic soda from USA ports. J.T. Knight, shipping agent.

New York Maru, to import and export containers from and to Far East. Montreal Shipping, agent.

## MAR. 14

Manzanares, to export forest products to Honduras. H.E. Kane, shipping agent.

## MAR. 16

Golden Sari III, to export grain to United Kingdom, McLean Kennedy, shipping agent.

—The Saint John Telegraph Journal (March 7, 1983)

In geography, for example, many objectives can be met using a port study. Among others, skills in library use, information gathering and classification, thematic mapping, atlas use, identification of distribution patterns and analytical thinking, as well as basic language skills, may be practiced. Varied content objectives can also be achieved including, possibly, a better knowledge of regional trade patterns, the interdependence created by international trade, the importance of the Port of Saint John, place locations around the world, the products of the Maritimes and Canada, the goods demanded by various regions of the world and the reason for, and necessity of, trade. Many other objectives could be emphasized by this sample shows well enough the flexibility and usefulness of such a study.

To achieve the stated objectives, the students involved must

be guided through a carefully organized procedure. The level of direction required will, of course, vary with the ability and research experience of the students involved. The steps outlined below are intended to be the basis of instructions to students working at an introductory level.

1. Students must locate the *Telegraph-Journal* in the library and find the relevant articles. Only a small sample of a few recent weeks, or perhaps of a few weeks scattered throughout the year, is needed.
2. The students then need to collect and organize the information from the articles so that they can easily see what products were imported and exported and where they came from or went to.
3. The information should then be mapped. The students draw two world outline maps to start the process. One will be for imports and the other for exports. These should include a scale and be appropriately titled. The maps may then be completed in greater or lesser detail according to the age and ability of the students and the teacher's stated objectives. If only generalities about trade are important, each product's nation of origin or its destination is located in an atlas and a line drawn from there back to Saint John. If greater differentiation is desired, each commodity line could be colour coded and a key provided to show which category of products (e.g., minerals) it belongs to. Even individual products may be identified by simply labeling the commodity line on the map with the name of the item it represents.
4. At this point, the student identify patterns. Rank-ordering, in terms of frequency of appearance, the areas of origin or destinations shown on their maps will help students



to see these. This type of analysis will quickly make it obvious with whom we trade the most.

5. The next step is finding an explanation of the distribution patterns identified. This requires further research on the products involved, their roles in the Maritimes or Canada and on the places to which we ship products involved, their roles in the Maritimes or Canada and on the places to which we ship products. For imports, the students will need, at the least, to consider the following basic questions: What is the commodity and what are its uses? Why do we need it? Why do we buy it where we do? For exports, the questions need only be modified.
6. The last stage for the student is reporting. Depending on the objectives, reports could be given orally or in writing. The maps and report would form the basis of individual evaluation.

This geographical exercise might easily be modified for history by using several samples of port activity over the years and doing a comparative analysis. Economics could be brought in by adding the amounts of trade to the information accumulated and then trying to explain the money flows and the mechanisms by which they occur.<sup>1</sup> More general social or local studies might also use the port study in appropriate units on trade or Canada's place in the world. Moreover, the study can easily be modified by using more or less teacher direction and assistance to fit most ability levels.

The shortage of formal, Maritime-oriented materials can thus be partly remedied by the creative use of inexpensive local primary resources. Such materials can be used to achieve many desirable educational objectives, whether behavioural or cognitive. Primary resources of this type, moreover, are not usually produced with particular teaching methods in mind and so can be adapted to fit any teaching style or strategy. The example discussed not only achieves a variety of useful objectives but can be reshaped for use as an individual project, a group project using and comparing samples, or, if reduced

in size, as an enrichment exercise<sup>2</sup> for that bright student who always finishes first and is rapidly becoming bored with the school experience.

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## Understanding would, in turn, help destroy the regional inferiority complex.

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Many other local materials might also be adapted for classroom use. Introduce the topic of industrial location by using the telephone book's yellow pages to map local industrial location patterns and then trying to explain and generalize the results. Explore the state of the regional economy with regional business reports such as those found in *Atlantic Insight* (April, 1984) or in the business section of the local paper. Working with these materials in groups or individually, students gain an accurate, up-to-date picture to replace the dated, textbook stereotype. Numerous topics might also be explored by utilizing year-end reviews such as those found every January in journals and newspapers. Collections of these reviews provide fuel for factual research to identify developments, patterns, questions and issues which should then be used to provoke further exploration in search of explanations.

The possibilities for combating Sou'wester Syndrome are as many and varied as educators are. Effective use of the regional resources approach advocated here has, not doubt, already been made by many teachers. Would it not then make sense to pool all these great ideas, perhaps through the pages of this journal? If this occurred, a systematic use of regional resources might become feasible and Maritime educators could introduce their schools to a more balanced view of the region. Changing points of view in this way would facilitate the replacement of stereotypes with an appreciation of the true nature of the region. Understanding would, in turn, help destroy the regional inferiority

complex. Students might even leave school with a heightened sense of self-worth as well as some cautious optimism about the strengths of this region and their place in its future.

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### NOTES

- 1 Tonnages could also be used. In either case, the teacher must obtain figures in advance. With them, students can scale the widths of the commodity lines on each map, thus producing directional-proportional arrow maps. The lines would then be of such a size, however, that they could only centre on, rather than originate in, Saint John. The rest of the process could remain essentially unchanged.
2. If the port study is to be used as an enrichment exercise, time will probably be limited. This can be overcome by making it an on-going project. It might also prove useful to eliminate the first section of research unless the school library keeps back issues of the *Telegraph-Journal*. To accomplish this, keep a file folder on hand with a number of clippings of the "News of the Port" in it. Update the folder frequently.

## Plan 17

### Canada's Links to the World - A Map Study

Objectives: Students will:

1. use atlases and gazetteers to locate and map the nations with which Canada is allied, trades with or to which Canada provides aid.
2. on the basis of the maps drawn, assess and comment upon the degree to which Canada is linked to the rest of the world.
3. evaluate the importance of the data by writing an assessment of Canadians' need to be informed about the rest of the world.

Materials: base maps of the world showing national boundaries - multiple copies per student; atlases 1:1

Procedure: NOTE: This activity is intended to be integrated with lessons on the international organizations to which Canada belongs and on our trade and aid links. It is not intended to be done as a single lesson. Such integration will provide a welcome variation in teaching methods during each class period as well as meeting the stated objectives.

1. After discussion of each organization to which Canada belongs, have students use the atlases and base maps supplied to create a thematic map showing the members of the group. Repeat this for every organization studied.
2. Repeat this procedure after discussion of Canada's trade links. Identify our current trading partners from the most recent statistics available. The most likely source for these would be the Canada Year Book.
3. Repeat this procedure after discussion of Canada's aid programs. Identify the current recipients of Canadian aid from the most recent statistics available. The most likely source for these would again be the Canada Year Book.
4. Once this map portfolio is complete, have students identify the countries to which Canada has significant links or, what is probably easier, those nations with which Canada has no ties. Discuss the significance of this with the class.

Assignment: Students submit the completed map portfolio built up during the unit for evaluation and also include a one page written commentary on the questions "To what extent do individual Canadians need to be informed about and aware of world events? Why?"