

In this chapter

Weather and Canadians

*Weather And Clothes • Weather And Your Day • Weather And Buildings
Weather And Business • Weather And Invention • Weather And Geography*

Climate Change

*Greenhouse Gases • How People Affect The Balance
Potential Consequences • How To Help*

CHAPTER 5



Canadians are fascinated by the weather, and rightly so. Few countries in the world have such a diversity of weather - not only from season to season but also from place to place.

Weather insinuates itself into almost every facet of Canadian life. It affects what you eat, what you wear, how you feel, and even what you do. Weather even provides a built-in excuse for what you do not do . . . because it is too hot or too cold or too wet. Weather has also played the mother of invention to a host of products.

But "Don't knock the weather," as the saying goes, "if it didn't change once in a while, 9 out of 10 people couldn't start a conversation."

Activity:

- ask your students to collect news reports from television or newspapers about unusual or severe weather for a month.
- They can report them to the class or put them in a scrapbook or both.

Weather and clothes

Weather affects not only the type of clothes you wear but even what colour they are. There is more to the saying, "Never wear white before Victoria Day or after Labour Day" than just concern for style. It is old fashioned sense. Light colours reflect more of the sun's energy than dark colours do and consequently are cooler to wear on a hot sunny summer's day. Conversely, the fashion favourite, black, absorbs much of the sun's energy and keeps you warm on a cool but sunny day. On cold days, you have probably been told to wear several layers of clothing to keep warm. That is because the air trapped between the layers acts as an insulator and slows down the loss of heat from your body.



To show your students the range of weather within your province or territory, have them do some mapping of your region using the blank maps provided beginning on page 11-3. They could start by locating and labeling the features and communities shown in the table on page 8-16. On a second map, have them plot the temperature that day at each of those communities. This information can be found by visiting <http://www.weatheroffice.ec.gc.ca> and selecting your province or territory.



To help your students visualize the range of weather in your area from season to season, have them complete the graphing exercise on page 8-15.

Weather and your day

Weather affects what you do too, beginning (for some) with the decision of whether to walk or ride to school. If you are bused, the school bus may take longer to get to school on a snowy day; heavier snowfalls may prevent the buses from running entirely. Bitter cold may force you to stay indoors during recess or lunch. A day of steady rain or a sudden but ferocious thunderstorm may prompt a rain check for field days or outings to conservation areas or parks.

Weather also affects what you do in other, more complex ways. Air quality advisories, also called smog alerts, prompt people with respiratory diseases to stay indoors. Many joggers and walkers put off their exercise until the advisory is lifted. Similarly, men and women who work outdoors take additional precautions when winter windchills reach dangerous levels. At the other end of the seasonal spectrum, a high Ultra-Violet Index will induce most people to reach for sunscreen and a hat for protection from the sun's rays.

Activity:

Have your students keep a record for one full day of all the decisions made during the day which were based on the weather. For example, did they wear a rain coat, ride a bike, put on a parka, play hockey, go swimming, etc.

Weather and buildings

Home builders consider the climate of a region when designing the layout of a house. In many parts of Canada, building a house with large windows facing south, for instance, can reduce heating costs. This is because, in winter, the sun is lower on the horizon. The sunshine pouring in through the windows will partially heat the house. Interestingly, in summer, the sun is more directly overhead so it does not have the same effect. The amount of insulation you put in the walls and ceilings of your

home may vary, too, depending on winter temperatures in your area.

Contractors must also build in adequate support for the maximum anticipated snow load. The weight of snow on a roof which is under-supported can cause it to collapse.

Activity:

Have your students compile a list of the features of their own homes that make good or bad environmental sense — for instance, coniferous trees to provide shade from the sun and shelter from cold winds, double- or triple-pane windows, colour and type of building material.

Although homeowners may rejoice at their savings during dry, mild winters, a bitterly cold winter can cost Canadians as a whole an additional \$500 million just to heat their homes.

Weather and business

Weather has economic consequences for many Canadian industries such as farming, transportation, and construction. Few, if any, occupations are totally safe from the vagaries of weather. For example, even a computer programmer who works from home is dependent on a continuous supply of electricity. The Canadian economy absorbs not only the direct costs for property damage from bad weather but also millions of dollars worth of indirect costs from the loss of revenue from sales and cancelled events. It is not only the large-scale events that affect the economy like the \$1 billion Saguenay flood, the multi-million dollar hail storms in Calgary, or the infamous ice storm of '98 in eastern Canada. Even a garden-variety thunderstorm can spell disaster for the farmer who just cut hay or the contractor who just poured \$10,000 worth of concrete.

Retailers can almost chart the weather from their record of sales. Fewer air conditioners and ice cream cones are sold during a cool summer than a hot summer, and snow blowers stay on the store's inventory much longer during a winter with little snow. It is not all bad news, though — the same snow-less winter that causes sales of snow blowers to decline is great for the city's snow removal budget.

Many retailers have learned to make the weather work to their advantage. For example, bakeries will produce more hot dog and hamburger buns if fair weather is anticipated for the weekend than they will if storms are predicted, as fewer people will fire up the barbecue.

Activity

- Have your students list 10 occupations greatly affected by the weather and identify which weather element is the most critical for each. Then see if they can identify 2 occupations not affected in any way. Remind them that most jobs are dependent to some degree on travel conditions to get to work and the availability of electricity once they arrive.
-

Weather and invention

Canada's weather, specifically the winters, has brought out the best in some of the country's more inventive minds. Canadians invented the snow blower, the snowmobile and snow garments such as polar fleece. Not surprisingly Canadians also invented insulation and frozen fish and have perfected the art of making ice wine.

Weather and geography

Canada is a huge country. It covers 7 per cent of the earth's surface. There are 4,600 kilometres separating the country's northernmost point, Cape Columbia on Ellesmere Island, and the southernmost tip, Point Pelee in

Ontario. And there are 4,955 kilometres between Beaver Creek in the Yukon, Canada's westernmost town, and Cape Spear, Newfoundland, which is the easternmost point in North America. It is no surprise, then, that the normal weather patterns are so different from one part of the country to another.



To help your students visualize the climatic variations in Canada, have them do the mapping exercises on page 8-18 and 8-19 of the Activity Section.

CLIMATE CHANGE

The terms weather and climate are not interchangeable. Weather is the state of the atmosphere at any given time. Climate is weather taken over a relatively longer period of time. The climate of a region is the longer-term average that describes the type of weather you may expect there from season to season. Or to put it another way, climate is the weather you expect — weather is what you get.

Climate is never static or stable. The earth's natural climate system has always been, and still is, changing. Scientists have looked at information recorded over the ages in ancient rocks, tree rings, and ice sheets. The evidence suggests that the earth has experienced numerous warming and cooling periods over the past 1 million years. Global ice ages appear to have occurred at roughly 100,000 year intervals, followed each time by a dramatic 4° to 6°C warming period. Scientists believe that natural climate change is caused, in part, by periodic variations in the earth's orbit and the sun's output. There is also a close correlation between warm periods and high concentrations of greenhouse gases in the atmosphere.

Greenhouse Gases

Life can exist on earth only because it has an atmosphere. The surface of the earth receives energy from 2 sources: the sun and the atmosphere. Part of the incoming energy from the sun is absorbed by the earth and then radiated

back into the atmosphere. Several gases that exist naturally in the atmosphere absorb this energy and, in turn, send some of it back to earth. These are popularly known as greenhouse gases, although the analogy is not strictly accurate. The glass in a greenhouse physically traps the sun's warmth inside whereas these gases do not deflect heat — they absorb it. Greenhouse gases that occur naturally include water vapour, carbon dioxide, methane, and nitrous oxide. Without these gases, the sun's heat would escape and the average temperature of the earth would drop from 15°C to -18°C, too cold to support life.



The earth receives most of its energy from the atmosphere, rather than directly from the sun. The sun's rays, while more intense, strike only part of the earth at any given time. The atmosphere, on the other hand, covers the whole earth all of the time.

How people affect the balance

Human activities seem to be upsetting the delicate balance of greenhouse gases in the atmosphere. They are causing more of these gases to be released into the atmosphere. For instance, carbon dioxide is produced when people drive their cars or burn fossil fuels to heat their homes. The burning of fossil fuels alone adds nearly 22 billion tonnes of carbon dioxide to the atmosphere every year. Plants and trees absorb carbon dioxide but clear-cutting forests reduces the number of trees available to absorb and hold it. Consequently, more carbon dioxide remains in the atmosphere.

Decaying matter in landfill sites and the burning of fossil fuels release large amounts of methane gas. Nitrous oxide is released when chemical fertilizer is used and fossil fuels are burned. Adding more of these energy-



One car produces 3.5 times its weight in carbon dioxide every year.

absorbing gases to the air means they will radiate even more heat back to earth, adding to the natural warming effect of the atmosphere.

Although scientists may not agree on exactly how much global warming will occur, or exactly how much the climate will change, they do agree that some warming has already occurred. Further, they agree that there will likely be more change to come.

Potential Consequences

A rapid warming of the planet could have a huge effect on all forms of life. Melting ice and glaciers could cause the sea level to rise, flooding coastal regions. The climate of various regions could change too quickly for many plants and animals to adjust. Warmer ocean temperatures would affect the fish population, causing some species to disappear and others to migrate. Harsh weather conditions such as heat waves and droughts could also happen more often and be more intense. These are just a few of the many implications of increased global warming.

How to Help

There are many things Canadians can do everyday to reduce greenhouse gas emissions.

- use the car less — walk, cycle, ride the bus, or start a car pool whenever possible
- use less energy in the house — turn down the heat when you are away and turn off lights and appliances when you are not using them
- send less garbage to the landfill — reduce, reuse, recycle, and compost waste whenever possible
- plant a tree — it will absorb carbon dioxide as well as provide shade to keep your house cooler in the summer and sheltered from the wind in winter.