What are the greenhouse gases?

Water vapour is the most common greenhouse gas but others are very important, too. Some occur naturally and some are made by humans.

Carbon dioxide or CO_2 is the most important of the greenhouse gases released by humans. It can be natural or made by humans and it is the major contributor to climate change – especially through the burning of fossil fuels when we drive, heat homes and other buildings or run our industries. Global deforestation – the clearing of forested areas – also adds to CO_2 levels because plants absorb carbon dioxide, and when there are fewer trees, there is less carbon dioxide absorbed. Scientists believe that if we keep going the way we are, we could double the amount of carbon dioxide in the air before 2050.

Methane is produced naturally when vegetation is burned, digested or rotted without the presence of oxygen. Today, large amounts of methane are released by garbage dumps, rice paddies, fossil fuels, and grazing cattle.

CFC's (chlorofluorocarbons) are industrial chemicals made by humans and used in air conditioning, foam, and cleaning solvents. CFCs also damage the ozone layer.

Nitrous oxide also occurs naturally in the environment, however, in recent years, quantities have increased because of human activities. Nitrous oxide is released when chemical fertilizer is used and fossil fuels are burned.

Is the earth getting warmer?

Yes. While scientists may not agree exactly how much global warming will occur, or exactly how much the climate will change, they do agree that some global warming has already occurred and there will likely be much more. In fact, the Earth's warmest years since 1881 have been: 1944, 1979, 1980, 1981, 1983, 1987, 1988, 1989, 1990, 1991, 1994, 1995 and 1996.

Most of these hot years were during the last twenty years!

What is being done?

Climate change affects the entire globe. Developed and developing countries are working together to find solutions to climate change. In June 1992, the United Nations Framework Convention on Climate Change was signed by 154 countries that agreed to stabilize the amount of greenhouse gases in the atmosphere at levels that didn't cause danger. Developed countries, including Canada, agreed to stabilize emissions at 1990 levels by the year 2000. In December 1997, countries are meeting in Kyoto, Japan to re-examine how best to address climate change. Besides reducing emissions, other solutions to climate change include helping developing countries to control their emissions, sharing new technology, education and training.

did you know?

An increase of 3 degrees Celsius may not seem like much. However, around 1000 AD a climate slightly warmer than today allowed the Vikings to settle Iceland and Greenland. About 500 years later their colonies had disappeared, partly because of a temperature drop of about 1 degree Celsius.

did you know?

One large tree can replace enough polluted air with clean air for four people to breathe for one day.

Word Match

1. **Name the most important greenhouse gas released by humans.**
2. **What greenhouse gas comes from rotting garbage?**
3. **What word means "clearing trees and forests"?**
4. **Name two types of transportation that do not use fossil fuels.**
5. **What might happen if the Earth gets warmer?**
6. **What do we call the blanket of air surrounding the Earth?**
7. **What happens with too many greenhouse gases?**
8. **What are two fossil fuels?**

a deforestation
b skateboarding
c atmosphere
d coal
e bicycling
f global warming
g oil
h sea level rise
i methane
j carbon dioxide

Responses 1 j; 2 i; 3 a; 4 b, e; 5 h; 6 c; 7 f; 8 d, g

What can we do?

There are many things we can all do on a daily basis to reduce greenhouse gas emissions. Probably the most important is to share what you have learned with your family and friends.

* Use the family car less. Walk or cycle whenever possible. Take a bus. Try ride sharing.
* Use less energy in the house by turning down the heat when you are away or sleeping and turning off lights and appliances you aren't using. Ensure your home is well insulated and well sealed.
* If your family needs a car, make sure they buy a fuel-efficient vehicle. The average car emits nearly 60 tonnes of carbon dioxide during its lifetime, compared to between 22 and 30 tonnes from fuel-efficient cars.
* Encourage your family to use the car more efficiently; for example, check the air in the tires. Underinflated tires can increase fuel use by 8%. Turn the car off instead of letting it run when it is stopped. Idling uses more gas and releases carbon dioxide into the air.
* Reuse, recycle and compost your waste. It takes much less energy to reuse or recycle a product than to make a new one. Correctly composting your food and yard wastes eliminates the methane that they would cause at the landfill site. Buying less is always best.
* Plant a tree. Trees absorb carbon dioxide, filter out pollution, provide shade, and look great. Canadians plant over 9 million trees annually in and around their communities.

ACTION 21
Down-to-Earth Choices

To find out more about climate change please contact:

Environment Canada
Enquiry Centre
Ottawa, Ontario
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Phone
1.800.668.6767

Or visit our website at
www.ec.gc.ca

Canada

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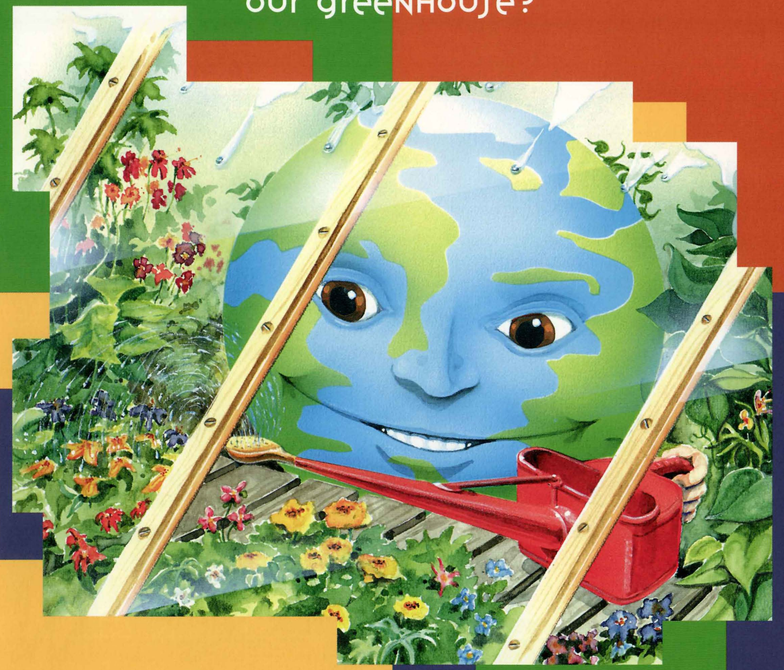
A Change in our Climate:

What's going on in our greenhouse?



Environment Canada / Environnement Canada

Global Climate Change

the atmosphere – more than just air

A lot of people think the atmosphere is just air. But it's more than that. It is actually a complex mixture of gases that surrounds the Earth, performing many functions and helping to support life on our planet.

the earth in a huge greenhouse?

As you know, greenhouses use glass to keep the heat in. And just as the glass in a greenhouse holds the sun's warmth inside, so the atmosphere traps the sun's heat near the Earth's surface. This keeps the Earth warm using what are called "greenhouse gases". Without these gases, the sun's heat would escape and the average temperature of the Earth would drop from 15 degrees Celsius to -18 degrees Celsius.

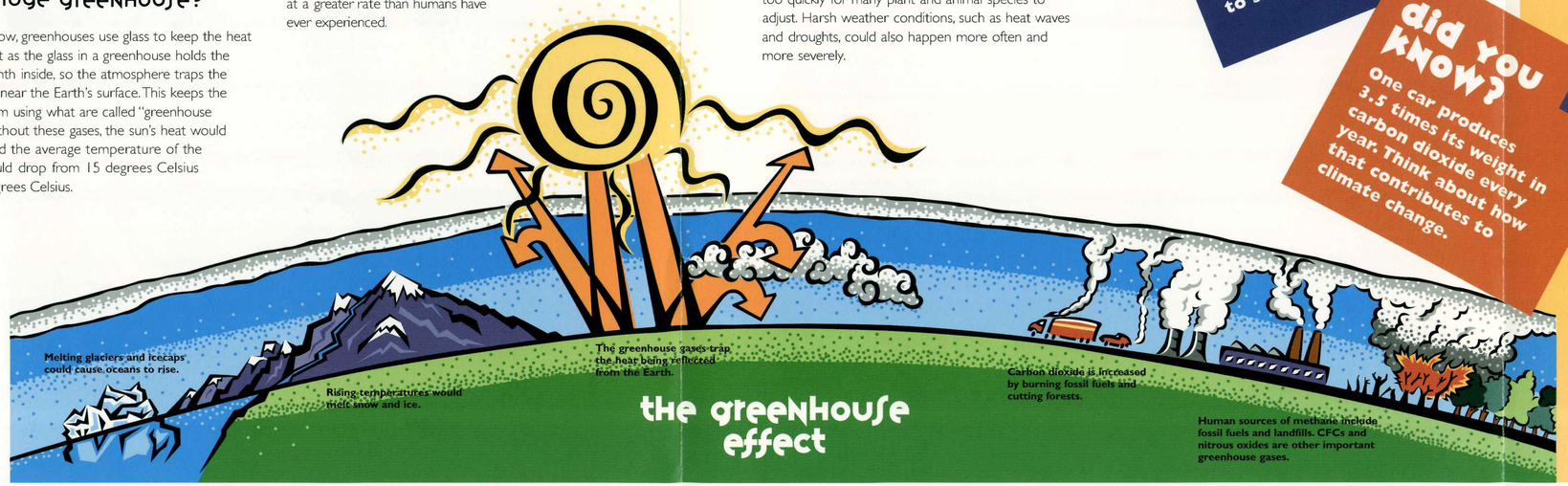
greenhouse gases and climate change

For thousands of years, the Earth's atmosphere has changed very little. The temperature and the careful balance of greenhouse gases have stayed just right for humans, animals, and plants to survive.

But today we are having problems keeping this balance. Because we burn fossil fuels to heat our homes, run our cars, produce electricity, and manufacture all sorts of products, we are adding more greenhouse gases to the atmosphere. These activities are changing the atmosphere at a greater rate than humans have ever experienced.

what could happen if the climate changes?

By increasing the amount of these "heat-trapping" gases, we are adding to the warming effect of the natural atmospheric greenhouse. This could warm the planet and have a huge effect on all forms of life. The global sea level could rise due to several factors including melting ice and glaciers. Rising sea levels could damage coastal regions through flooding and erosion. The climate of various regions could change too quickly for many plant and animal species to adjust. Harsh weather conditions, such as heat waves and droughts, could also happen more often and more severely.



the greenhouse effect

in what ways do we contribute to climate change?

We live in a large country with relatively few people and lots of miles between us; so we rely on vehicles to move us around and to move our products from place to place. We also experience very cold winters, so we burn a lot of fossil fuels such as coal, oil or gas to keep our homes, offices and schools warm. We're lucky that Canada has abundant energy of all kinds, but we use much more energy than we really need.

did you know?

If it were not for the natural greenhouse effect, the Earth would be too cold to support life.

did you know?

One car produces 3.5 times its weight in carbon dioxide every year. Think about how that contributes to climate change.

what could happen in canada?

It depends on where you live. As you know, our large country has many regions and they would all be affected by climate change differently. The following outlines some changes that could occur in your area of Canada as our climate changes:

pacific coast

* A rise in sea level would threaten low-lying coastal lands, such as the Fraser River delta, with possible flooding and erosion.
* More rain and snow could cause landslides and flooding.
* A warmer climate would allow insect pests and diseases to migrate north and add stress to our forests. These same forests would become drier and more likely to catch fire.

prairie provinces

* Higher temperatures would bring drought to the Prairies more often.
* A warmer climate would increase growing seasons and expand agriculture northward, but poorer northern soils would limit the amount of crops that could be produced.

great lakes and st. lawrence basin

* Warmer summers would increase the amount of water evaporated from land and lakes. As a result, water levels in the Great Lakes could fall by between half a metre and a metre and the amount of water flowing out of the St. Lawrence could be reduced by 20%.
* Some fish species would disappear from the lakes while other species would move northward.
* Less snow could shorten the ski season for southern Quebec and Ontario.

atlantic coast

* A rise in sea level would cause floods in low lying areas and coastlines, like those of Prince Edward Island, Halifax and Saint John.
* Warmer ocean temperatures would affect the distribution and makeup of the fish population. Some fish species would disappear and other species would migrate here.

the north

* There would be shorter snow seasons, but more build-up of snow. This could bury food for northern wildlife and result in heavy spring flooding along many northern rivers.
* Gradual melting of the permafrost would change the land, affect the way water drains, and affect roads, pipelines, and buildings.

Environment Canada has a climate change website with more information on this issue. Check out

www.ec.gc.ca