

ENGLISH

Climate Change Word Guide:

***101 climate change words
and their meaning***



UP-NORTH ON CLIMATE
Climate Change Impact and Adaptation
Study for the North of Ontario

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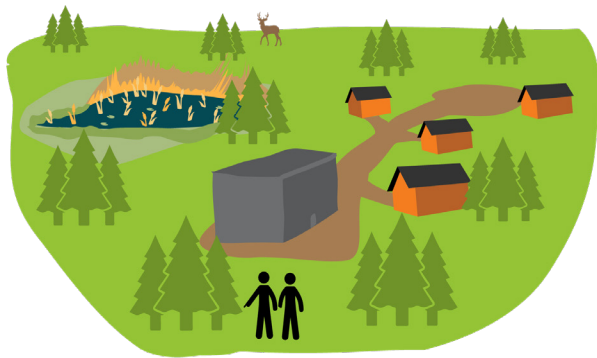
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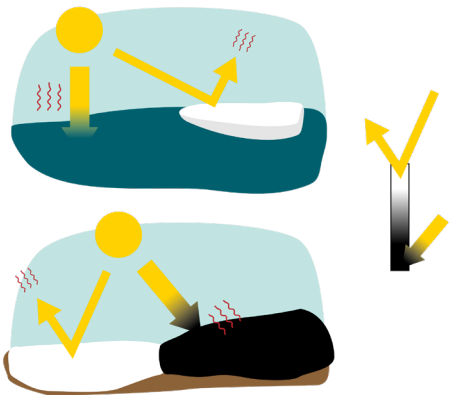
Adaptation, Adapting

The process of adjusting and preparing to adjust to the expected effects or impacts of changing conditions, including climate change. Adapting to climate change by humans can mean taking advantage of opportunities, such as a longer growing season, as well as finding ways of reducing damage to communities and risks of harm to people. Some plants and animals also adapt by taking advantage of changing conditions, but others can become endangered or even driven to extinction by climate change.



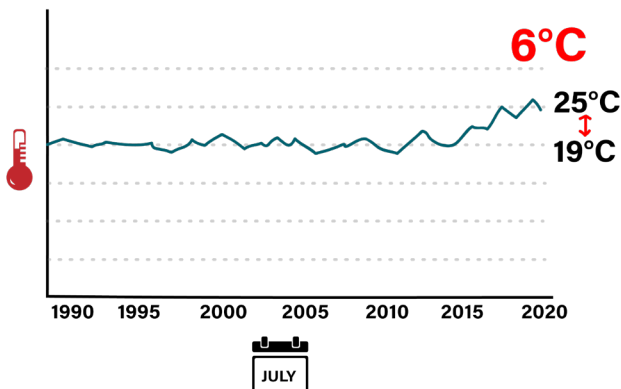
Adaptive Capacity

Adaptive capacity is the ability of a person, species, or community to adjust to changing environmental conditions. People may have high adaptive capacity because their knowledge, skills and willingness allow them to successfully hunt deer as these animals become more common than moose in their area. Those with a high adaptive capacity will be more likely to cope with the effects of changing climate. Adaptive capacity comes from the skills, tools and strategies used to increase resilience against change.



Albedo

The amount of sunlight and energy reflected by a surface or an object, its reflectivity. Albedo is measured on a scale of 0 to 1. Light coloured objects, like snow, have a high albedo of about 0.80, or 80% reflection. Dark coloured objects, like black rock, have a low albedo of about 0.15, or 15% reflection. The light (and energy) that is not reflected is absorbed, so albedo is used to calculate the energy budget of the Earth. For example, as glaciers melt, the albedo of that region becomes lower (less light reflected and more absorbed), leading to more heating of Earth.



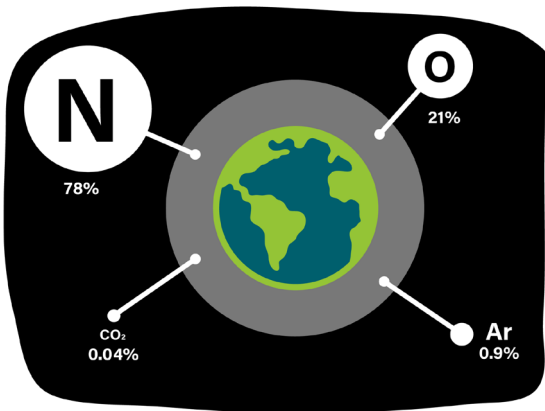
Anomaly

An anomaly is something that is outside of what is normal. In climate terms, it is the difference between the measured value of a climate variable, such as temperature, and its normal or long-term average value. For example, if the average high temperature for July in the past 20 years in Thunder Bay is 19°C, then an average high of 25°C for July 2018 is an anomaly of 6°C.



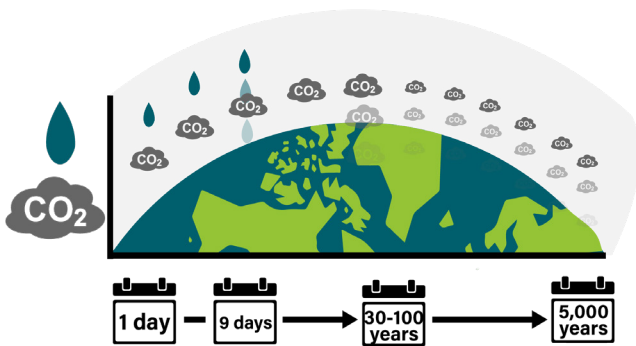
Anthropogenic

Describes something made by people or that is the result of human activity. For example, anthropogenic climate change means climate change effects that are a result of human activities.



Atmosphere

The envelope of gases surrounding the Earth like a blanket. The atmosphere is mainly made of nitrogen (78%) and oxygen (21%) that we breathe. It also includes trace gases such as argon (0.9%) and greenhouse gases like carbon dioxide (0.04%). It is where clouds form from water vapour that evaporates from the oceans and the surface of the land.



Atmospheric Lifetime

The amount of time the smallest part (a molecule) of a gas or vapour typically stays in the atmosphere before it is removed or broken down. The atmospheric lifetime of a drop of water is about 9 days before it falls to the ground. Carbon dioxide generally stays in the atmosphere for 30 to 100 years, but about 20% lasts for thousands of years. The carbon dioxide we emit today has long lasting implications for future climate.



Biodiversity

The variety of living beings on Earth including microbes, plants and animals. It is the natural wealth of the planet that provides humans with resources and natural ecological services like clean water and air. Climate change and pollution put this rich web of life at risk by disrupting natural processes and cycles.

B



Biofuel

Fuel that is most often made from plants and organic waste, called biomass. Biofuels can be made from wood and agricultural waste, food waste including vegetable oil and compost, and anything in municipal waste that can rot. Biofuel can be used instead of oil and coal, which release high amounts of carbon.



Biomass

Materials that come from previously or currently living animals, plants, microbes, including rotting material from above and below ground. For example, trees, tree leaves, crops, grasses, roots, and animal waste.



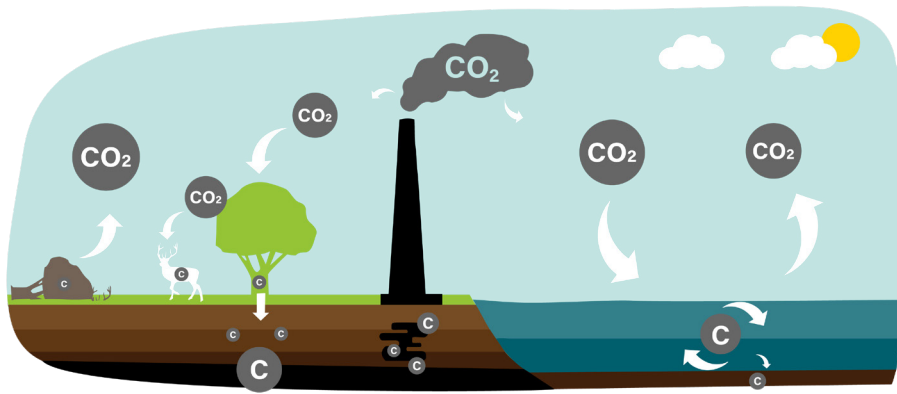
Biosphere

The biosphere refers to all life on the planet. All ecosystems and living beings in the air, on the land, and in the water, as well as their dead and decaying parts and wastes.



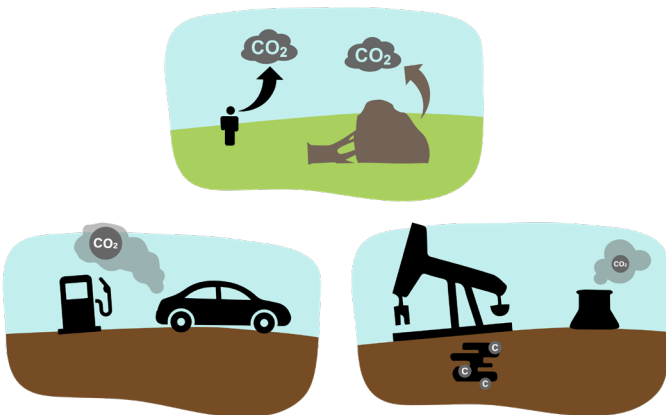
Carbon

Carbon (C) is one of the most abundant elements in the Universe. It is found everywhere on Earth; in the air, on the land, in the water and in all living beings. It is the common element to all known life; the human body is 18% carbon. Diamonds, and the graphite used in pencils, are 100% carbon.



Carbon Cycle

The way carbon moves through the air, the land, the water, and living beings. Plants use carbon dioxide from the atmosphere to grow. When a plant is eaten by an animal, the carbon is incorporated into the animal's body. When the animal breathes, they exhale carbon dioxide. When the animals and plants die and decay, the carbon is released to the atmosphere by the actions of microbes. Carbon dioxide dissolves into water and is stored in oceans. Carbon can also be stored in long-lived organisms like old trees or in fossil fuels which are the ancient remains of plants and microscopic animals deeply buried and not totally decayed. Burning trees and fossil fuels quickly releases their carbon into the air increasing the greenhouse effect and the average global temperature.



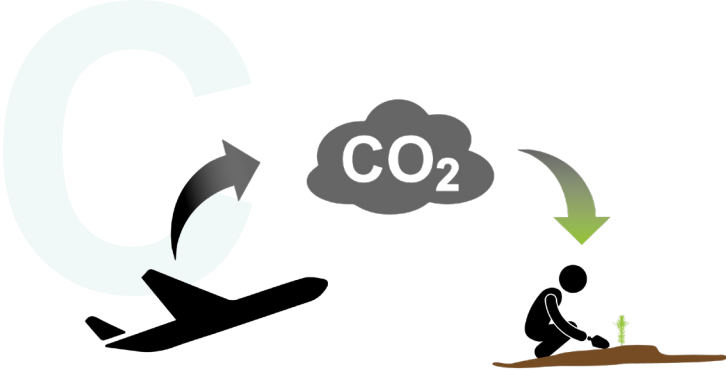
Carbon Dioxide

Carbon dioxide (CO₂) is a gas that is released into the atmosphere through natural processes like breathing and the decay of dead plants and animals. It is also released by the burning of fossil fuels like gasoline in vehicles and from generating energy in coal-fired power stations. It is the main greenhouse gas released by human activity and its atmospheric lifetime is over 200 years.



Carbon Footprint

The amount of carbon emitted every year, measured in metric tons, calculated for a person, a family, a building, an organization, or a community. Your carbon footprint includes the carbon in the carbon dioxide produced by burning fossil fuel to heat your home or run your car or quad, as well as burning fossil fuels to transport the products you buy and the food you eat to your local stores.



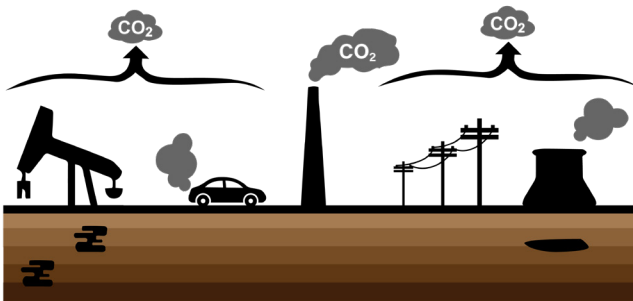
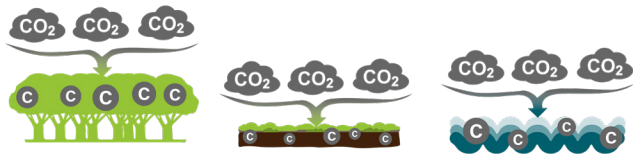
Carbon Neutral / Carbon Offsets

Being carbon neutral means the amount of carbon dioxide emitted by an activity or a process is equal to the amount captured from the atmosphere by starting a different activity, like planting trees which are carbon sinks. That would be called a carbon offset.

For example, an event like a conference can cause the release of carbon from delegate travel and food. If that event is estimated to produce 1 metric ton of carbon dioxide, it can become carbon neutral by engaging a charity to plant trees that will absorb 1 metric ton of carbon dioxide as they grow. An industrial operation, like a mine, would normally start by reducing its emissions as much as it can before investing in carbon offsets. If all its emissions are equal to its offsets, the mine could be considered carbon neutral.

Carbon Sink / Carbon Stores

A natural process on the Earth that removes carbon from the atmosphere like the growth of trees. Peat made of plants, like moss in cold climates like the Hudson Bay Lowlands, does not completely decay and is a very good long-term carbon sink. Carbon dioxide dissolves in oceans, so they are also carbon sinks. The oldest of carbon sinks are fossil fuels made up of ancient, buried animals and plants.



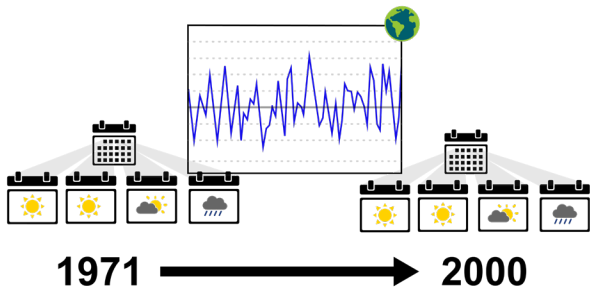
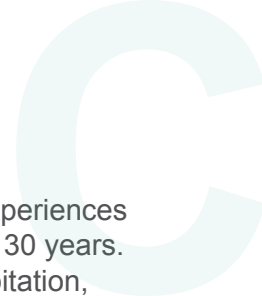
Carbon Source

A natural process on the Earth that adds carbon to the atmosphere, like the decay of trees. Burning coal, oil and gas extracted from underground puts carbon into the atmosphere that has been stored underground for millions of years. Deforestation, agriculture, and forest fires all add carbon and are therefore sources that amplify the greenhouse effect.

Carbon Tax

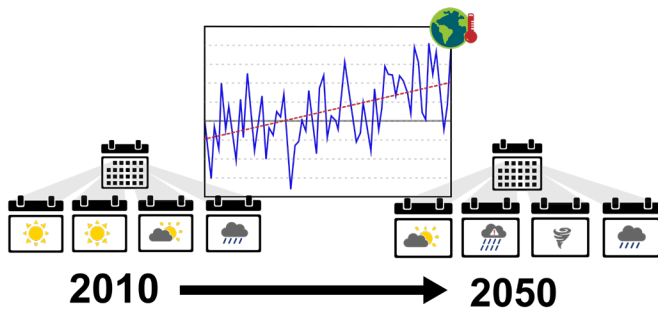
A tax on energy sources that emit pollution containing carbon dioxide, like the burning of coal, oil and gas. The intention of actions that increase the cost of burning fossil fuels is to boost the use of technology that does not produce carbon dioxide and contribute to climate change.





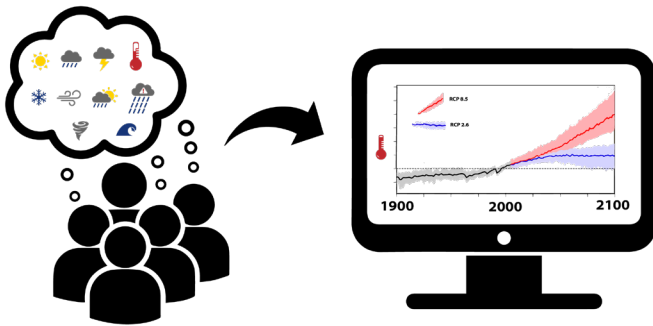
Climate

Climate is the average weather a place experiences over a long period of time, usually at least 30 years. This includes average temperature, precipitation, wind speed and direction, and more. For example, the climate of Thunder Bay (from 1971-2000): average yearly temperature 2.5°C; a total of 559mm of rain per year; 188 cm of snow per year; average wind speed of 11.7km/h; total of 2168 hours of bright sunshine per year.



Climate Change

A slow change in weather patterns and average weather during the seasons over the whole of the Earth, over a long period of several generations. Such serious change is caused by both natural processes and human activity. As humans continue to burn fossil fuels and release carbon dioxide into the atmosphere, climate change will continue to occur at rates much faster than natural, historical averages. Climate change is seen in rising the global temperature, altered rain and snowfall patterns, warming oceans that is leading to rising sea levels as warming ocean water expands, as well as many other impacts on humans and all life on Earth.



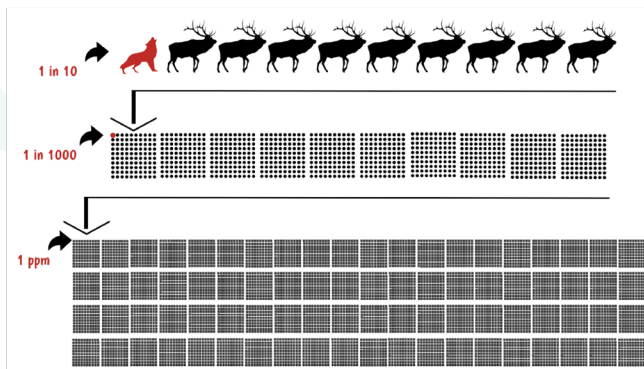
Climate Model

A mathematical way to learn and show how the atmosphere, oceans, land, ice, living beings, and the Sun, all affect the Earth's climate. Climate models are tested by having them show what the climate is like now. Once a model can do that, it can be used to predict how climate is likely to change in the future depending on how much carbon dioxide is added to the atmosphere.



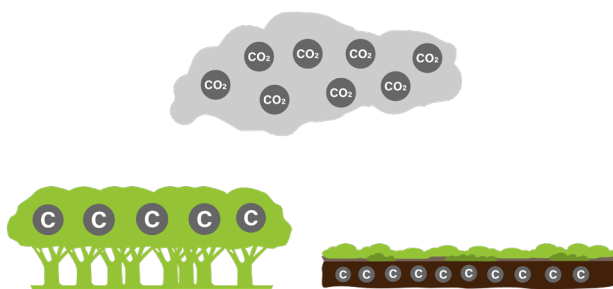
Coal

Coal is a rock formed when thick layers of fallen trees and other plants are buried under hundreds of metres of sand and mud for millions of years. Many deposits of coal were formed 100 to 300 million years ago and act as carbon stores underground. This solid fossil fuel is burned for heating but mostly to produce electricity. When it is burned it releases carbon dioxide into the atmosphere adding to the greenhouse effect. Burning it also releases pollutants such as mercury contained in the fossil plants.



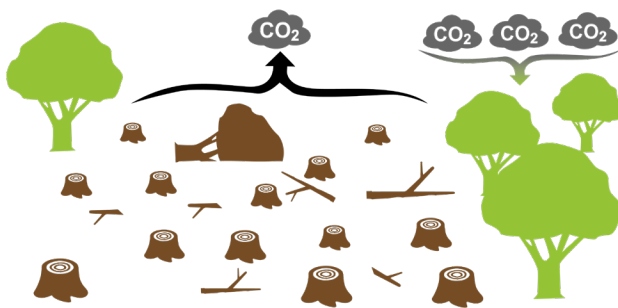
Concentration

The amount of a substance in a specific amount of air, water, soil, or other material. Concentration is often expressed as parts per million (ppm), parts per billion (ppb) or parts per trillion (ppt). To visualize, if you saw a wolf in a herd of 1 million caribou, the wolf would represent 1 part per million. One dollar in \$1,000,000,000 is 1 part per billion.



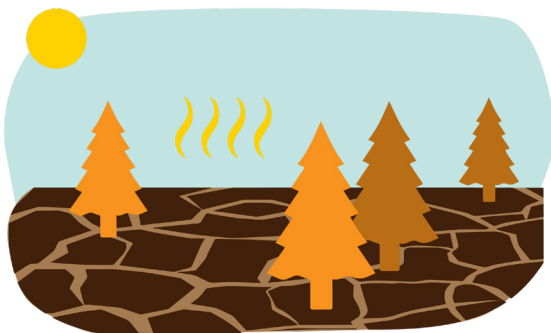
Content

The amount of a substance in air, water, soil, or other material. In climate change, carbon content of soils or trees is often referred to as carbon stores. For example, the content of the carbon stored in the Hudson Bay peatland is estimated to be 30 billion metric tons, the equivalent of 1,360 trains the length of Canada carrying 100 tons of coal (80% carbon) in each train car.



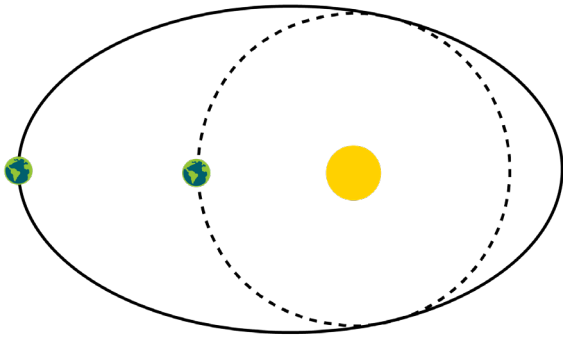
Deforestation

Removal of trees from an area either by logging or by natural processes such as a windstorm or wildfire. Deforestation drives climate change in two ways: (1) addition of a carbon source: the downed trees are burned or decay, which adds carbon to the soil but also releases carbon dioxide into the atmosphere, and (2) removal of a carbon sink: the trees that once removed carbon dioxide from the atmosphere as they grew are no longer there to do that. However, if trees are used as construction material, they are still carbon stores for as long as the building stands. Also, deforestation is usually followed by regrowth of trees which starts another period of removal of carbon dioxide from the atmosphere.



Drought

Abnormally dry weather with little to no rain that lasts long enough to cause water shortages.



100,000 years

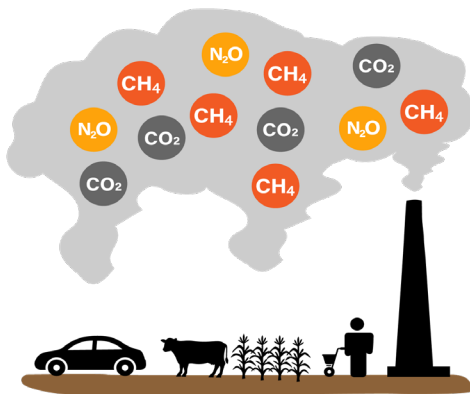
Eccentricity

The degree to which the orbit of an object differs from a perfect circle. For example, the Earth's orbit around the Sun is not a perfect circle, instead it is an oval shape. At present, Earth is just over 5 million kilometres closer to the Sun in January than in July. It changes slowly over thousands of years. This change, combined with changes in the tilt of the Earth, has controlled the very slow growth and melting of ice sheets during the Ice Ages of the last 2 million years.



Ecosystem

All living beings in an area (plants, animals, microbes, etc.), together with their environment (air, land, water, rocks), dynamically interacting and functioning as a network.



Emissions

The release of a substance, typically a gas, such as carbon dioxide into the atmosphere.



Energy Balance

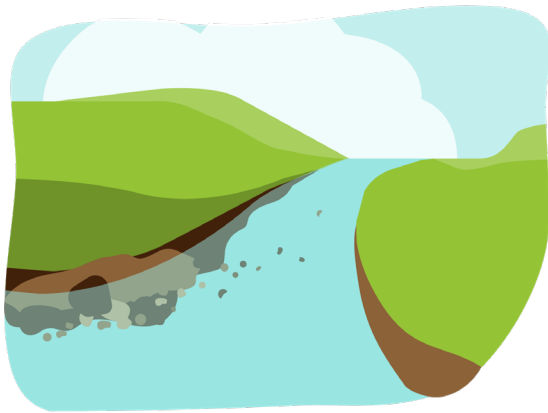
The difference between the energy that reaches the Earth from the Sun and the energy that leaves the Earth as it radiates energy back into the atmosphere and on into space. If more energy reaches the Earth than leaves, warming happens. That is what is happening now. If less energy enters than leaves the Earth, cooling happens. That is what happened when the ice sheet of the last Ice Age expanded to cover Canada. When the energy that enters and leaves is the same, then the planet remains at the same temperature. It is the intention of the international Paris Climate Change Agreement, signed in 2015,

to reach that balance within 1.5 °C of today's average global temperature of the Earth because too much heating can lead to disruptions to natural cycles increasing the risk of extreme weather events.



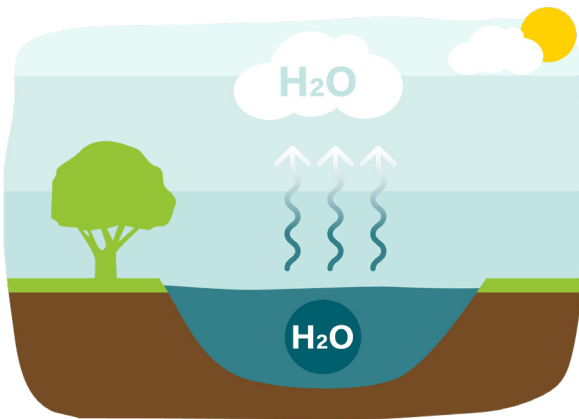
Energy Efficiency

A process or piece of equipment that uses less energy to do the same task or provide the same service as another process or tool. For example, energy efficient windows that provide good insulation or a car that gets good mileage.



Erosion

When soil, rock, or other material is picked up and moved to another place by ice, water, wind, or gravity. Eroded materials can be moved only a few millimeters or transported thousands of kilometers away.



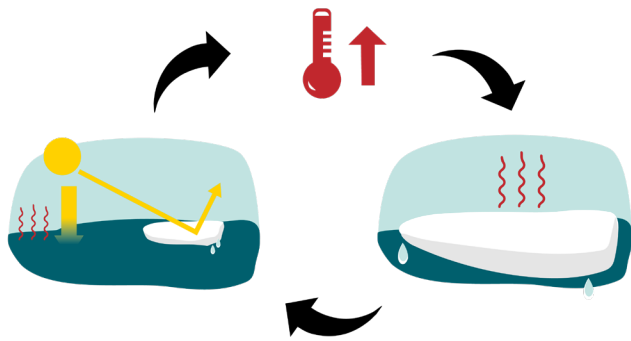
Evaporation

When a liquid like water changes into a gas or into vapour. When drying clothes on a clothesline, the water evaporates into the atmosphere. Normally, warmer temperatures cause more evaporation unless the air is already saturated with water vapour like on a foggy day.



Extreme Weather Event

Strong and unusual weather events such as heavy rains causing flooding, severe windstorms, heat waves and drought. Climate change is expected to increase the frequency of extreme events especially extreme rainfall.



Feedback Mechanisms

When the result of a process impacts the rate at which that process occurs. Feedback mechanisms can increase the rate of change (positive feedback) or decrease the rate of change (negative feedback). For example, thawing permafrost is leading to positive feedback of warming. Global warming is causing permafrost to thaw. Thawing permafrost releases greenhouse gases into the air from the warming soil, which increases the greenhouse effect, which, in turn, causes temperatures to continue to warm, thawing more permafrost, and so on.



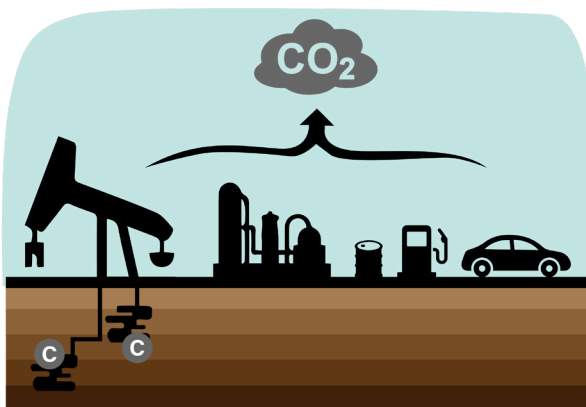
Flooding

Flooding can happen as a result of heavy rain, rapid snow melt, storm surges driven by wind at high tide along a coast, or an ice jam in a river causing the river to overflow its banks. Flooding from rain falling in late winter or early spring while the ground is still frozen is a growing problem in northern communities.



Food Security and Sovereignty

A food-secure person or group can be confident of having enough food to meet their need for a healthy diet. Wild food such as moose, caribou and geese, are becoming harder to find as climate change affects wildlife populations and migration patterns. Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods.



Fossil Fuel

A source of energy that originates from fossilized layers of fallen trees buried under sand and mud millions of years ago forming coal, or from the buried remains of microscopic plants and animals converted into oil, and natural gas by heat and pressure deep underground over millions of years. Fossil fuels release carbon dioxide into the atmosphere when coal is burned in power generating plants to produce steam that turns turbines to produce electricity, or when gasoline is used in the engines of vehicles.



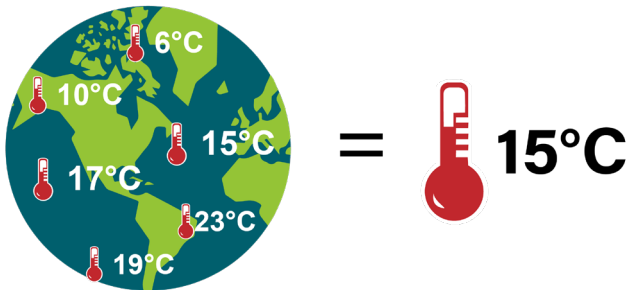
Freezing Rain

Rain that falls as liquid but is right at the freezing point and so it freezes as soon as it contacts the ground or other surfaces, building up a layer of ice that can break trees and cause structures like power lines to collapse. Freezing rain forms when snowflakes melt into rain drops in a layer of warm air and then fall into a layer of very cold air close to the ground. The cold – warm – cold air is like a sandwich in the atmosphere.



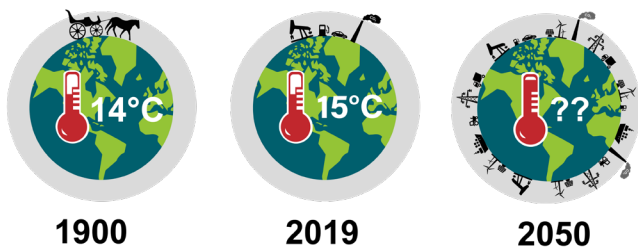
Glacier

The accumulation of snowfall over many years that turns to ice under its own weight. Glaciers are found on every continent except Australia. Glaciers move over time as a result of gravity causing erosion of the rock beneath it. Glacier ice is the largest reservoir of freshwater on the surface of the planet.



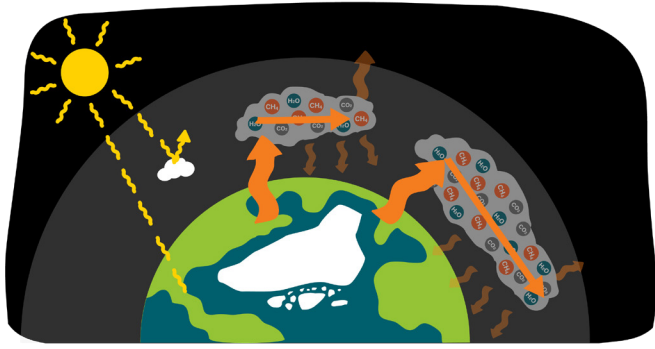
Global Average Temperature

A calculation of the average air temperature 2 metres above the surface of the Earth. The calculation is based on thousands of weather stations over land and oceans and is calculated every year to track changes.



Global Warming

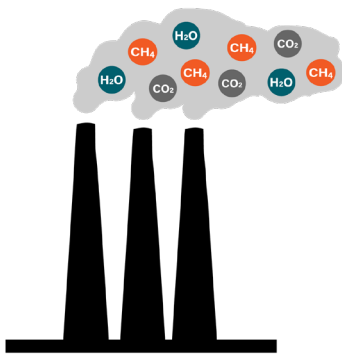
The gradual increase in the overall temperature of the Earth due to increased concentrations of heat-trapping greenhouse gases in the atmosphere. This heating could lead to disruption of ocean winds and the polar jet stream causing extreme changes in temperatures from one day to the next and even causing winters to be colder in your community than before.



lot of the long-wave energy and are warmed. This process of trapping heat in the atmosphere, like a warming blanket, is what keeps Earth at an average temperature of 15°C, allowing life to thrive. Without the greenhouse effect the average temperature on Earth would be -18°C. With pollution, more greenhouse gases are being added to the atmosphere, making the Earth warmer, which is causing climate change.

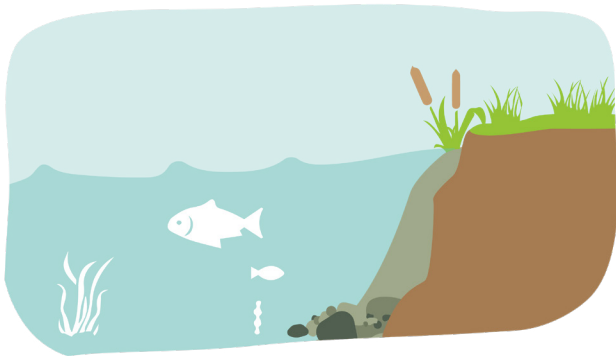
Greenhouse Effect

The process through which heat is trapped in the atmosphere. The short-wave energy received from the very hot Sun enters the atmosphere; some is reflected by clouds but most passes through the atmosphere and warms the land and oceans. The warm Earth radiates energy back toward the very cold environment of space, but that energy is in the form of long waves that don't pass easily back through the atmosphere. Instead, the greenhouse gases like water vapour, carbon dioxide and methane, as well as a few other gases, absorb a



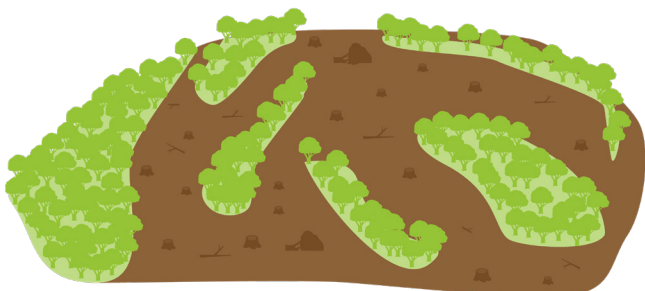
Greenhouse Gas (GHG)

Gases in the atmosphere such as carbon dioxide, water vapour, methane, nitrous oxide, and ozone that trap heat. Greenhouse gases form both naturally and as a result of human industrial processes. As the concentration of these gases in the atmosphere increases, the blanket of greenhouse gases will trap more and more heat, warming the planet. For example, carbon dioxide has increased from a long-term average of 280ppm before 1900, to 415ppm in 2021.



Habitat

The natural home or environment of a plant, animal, or other living beings. On a broader scale, a habitat is an area that provides all the necessities of life (food, water, air) to a community of plants, animals and other living beings. For example, the boreal forest is a habitat, as is a desert, a grassland, and a pond.



Habitat Fragmentation

When an area of habitat that was once a single large area gets broken into smaller, more isolated patches of habitat. For example, woodland caribou require large areas of untouched forest; when a forest is logged or if there is development, they will avoid those areas and only use the forest away from the disturbance.



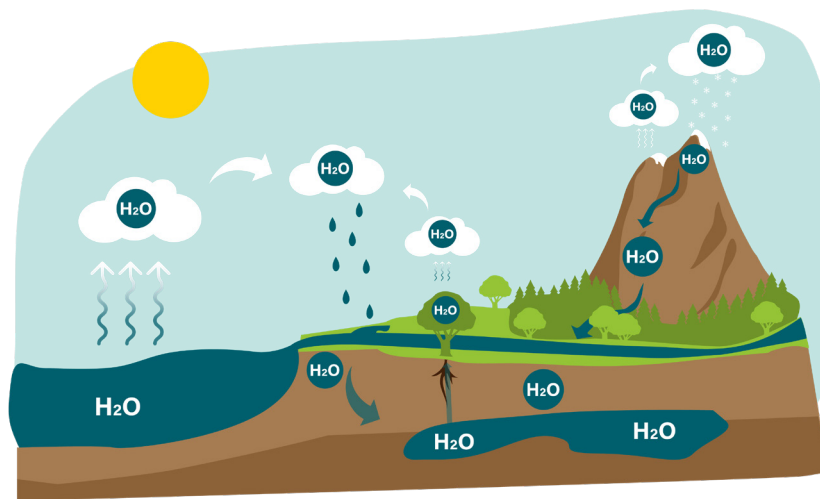
Heat Stress

The body's reaction to exposure to several days of extremely hot weather, close to or warmer than our body temperature of 37 °C and remaining above 20 °C at night. Symptoms include dizziness, nausea, headaches and, in extreme cases, death. Cooling centres with air conditioning can be set up in communities to help people, especially vulnerable elderly and small children, keep cool and avoid heat stress.



Heat Wave

A period of very hot weather lasting more than a few days. Depending on the location, if the hot air has come from somewhere like the Gulf of Mexico, high temperatures are often combined by high humidity, making it difficult to cool down by sweating.



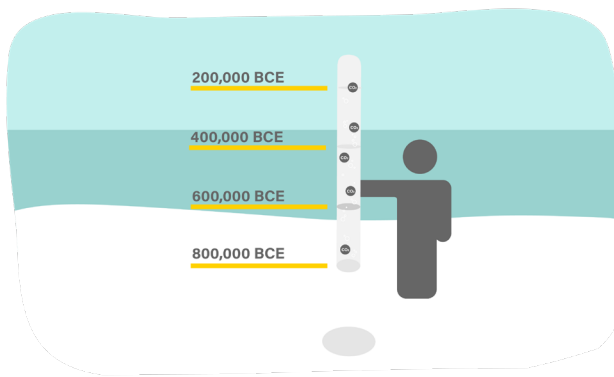
Hydrologic Cycle (Water Cycle)

The way water (H₂O) moves through the air, the land, the water, and living beings. Water on the surface of the Earth evaporates (dries and becomes a gas), condenses in the atmosphere (cools and becomes a cloud of fine droplets of liquid), falls back down to the surface as rain or snow, and can seep into the ground or be collected in bodies of water such as lakes and the oceans. Water can also collect as frozen glaciers and be eventually released again when they melt. The hydrologic cycle is a very important part of the climate.



Ice Age

A period of tens of thousands of years when glaciers and ice sheets covered large areas of the Earth. The average temperature of the Earth was just 5°C to 7°C colder than today. That allowed snow to last into the spring and eventually through the summer. Energy from the Sun reflected by the snow helped lower temperatures. The 5 Ice Ages in the last 2 million years are thought to have been caused by changes in the tilt of the Earth and its orbit around the Sun. We are at the end of the most recent Ice Age with Greenland still covered by the ice sheet that covered all of Canada 20,000 years ago.



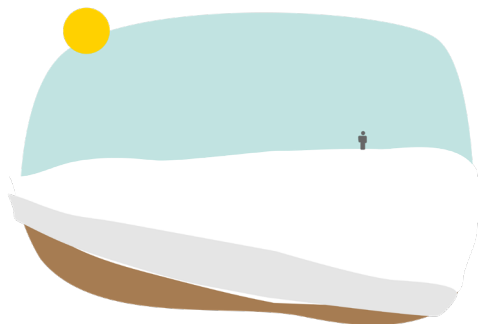
Ice Core

A long sample of ice removed by drilling into a glacier or ice sheet. By looking at the substances in air bubbles once trapped in the snow that became ice, scientists can determine how much carbon dioxide was in the atmosphere in the past. Analyzing the ice itself allows an estimate of the temperature at the time the snow fell.



Ice Jam / Ice Dam

An ice jam, or ice dam, happens when large pieces of ice flowing downstream run into an obstacle like a narrowing in a river, a bridge or even intact ice. Pieces of ice are pushed on top of each other and block the flow of water. This generally happens in spring when snow and ice begin to melt and water levels rise carrying ice chunks. The rivers flowing into Hudson Bay are especially at risk of ice jams because their headwaters are in the warmer south and so upstream melts before downstream does. An ice jam acts like a dam and water backs up behind it and causes upstream flooding. Flooding can also occur when ice jams break and release large amounts of water in a short time. Ice jam flooding can cause damage to communities built near riverbanks.



Ice Sheet

A thick layer of ice covering a large area of land for a long period of time. Ice sheets form when falling snow does not melt completely in the summer and accumulates over the years because of colder temperatures. The ice sheet of the last Ice Age in northern Ontario was about 2 kilometres thick.



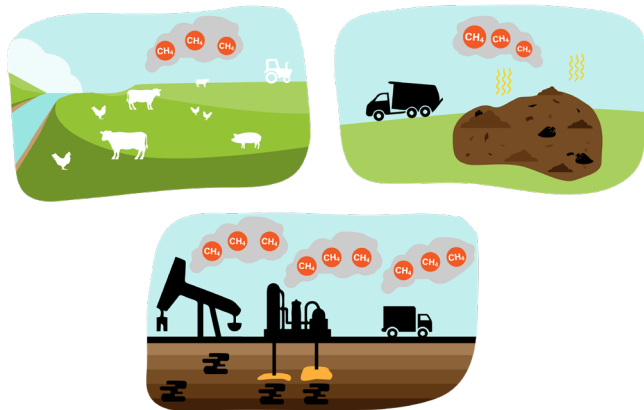
Invasive Species

Species that have moved into an area where they were not previously found, usually because conditions influenced by climate have changed. Invasive species negatively affect the ecosystem of the area. For example, purple loosestrife, a purple-flowered plant introduced to Northern Ontario and originally only growing in Europe and Asia, forms dense stands at the water's edge and can crowd out native plants as well as reduce shelter and nesting sites for birds, fish and wildlife.



Maladaptation

A trait that is, or has become, more harmful than helpful. In the context of climate change, maladaptation would make something more likely to be harmed by changes in climate. For example, snowshoe hare change to white in the winter to be more difficult for predators to see against the white snow. With shorter winters, they are now more often white when there is no snow on the ground, making them easier prey.

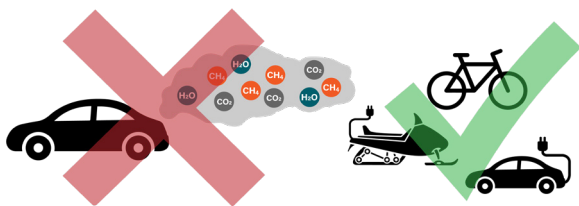


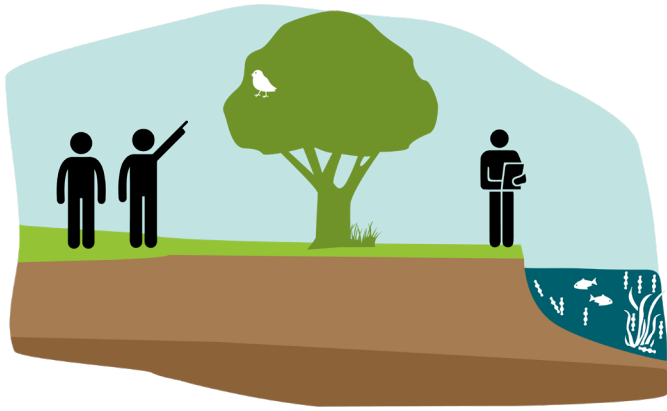
Methane

Methane (CH_4) is a greenhouse gas produced by natural processes, such as animal digestion and by microbes in wetlands. It can also be produced through human activity such as rotting food in landfills and the inefficient partial burning of fossil fuels. The average lifespan of methane in the atmosphere, or its atmospheric lifetime, is only about 12 years compared with 200 years or more for carbon dioxide. However, one molecule of methane retains 25 times more heat than one molecule of carbon dioxide.

Mitigation

Reducing emissions of heat-trapping greenhouse gases into the atmosphere, and protecting and creating carbon sinks to prevent the Earth from continuing to warm. To reduce emissions, we need to transition from powering our world with fossil fuels to using clean, renewable energy. We also need to make our homes, buildings, farms, industries, and transportation methods more efficient, reduce waste (especially food waste) that goes to landfill, and eat less farmed meat. To protect and create carbon sinks we need to use nature-based solutions; protecting and restoring wetlands and forests will capture more greenhouse gases from the atmosphere and reduce warming.





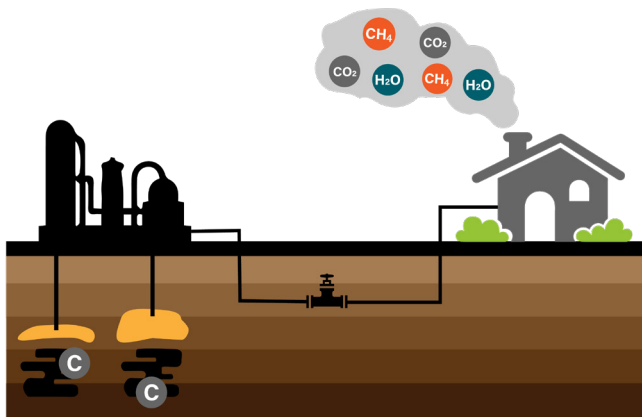
Monitoring

Monitoring is the act of observing the animals and the plants, the water and the land. It is the basis of Traditional Ecological Knowledge gathered over generations by Indigenous people and used in the successful gathering of food and medicine, understanding weather patterns, and navigating on the land.

Monitoring using western science is the documentation over time of the land, animals, and plants with the goal of understanding and responding to changes in the environment. It is the collection of information leading

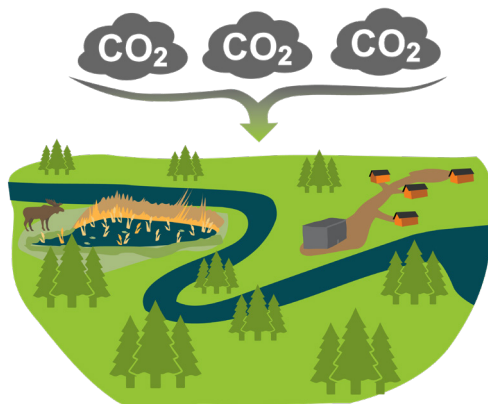
to knowledge and understanding of a problem or situation which improves the chances of making informed decisions. Monitoring can be for assessing compliance with a plan or for measuring the effectiveness of selected actions.

Community-based monitoring is led by a First Nation community and integrates Traditional Knowledge and western scientific methods. The community designs and implements the monitoring project and community members gather information. Community-based monitoring is sometimes done in collaboration with local scientists. In the context of climate change, communities may wish to monitor weather, climate, and the environmental effects of climate change on their community and Traditional Territories.



Natural Gas

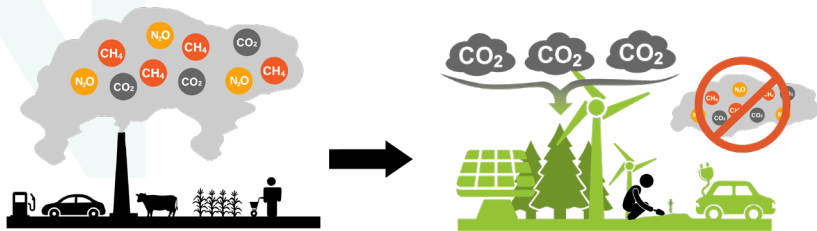
Natural gas is a gas formed when layers of small animals were buried under hundreds of metres of sand and mud for millions of years. Many deposits of natural gas were formed 100 to 300 million years ago and act as carbon stores underground. This fossil gas, consisting mainly of methane, is commonly used for heating, cooking, and electricity production. Natural gas is a fossil fuel and, as such, it releases greenhouse gases when burned.



Natural Climate Solutions / Nature-Based Solutions

Natural climate solutions are in some respects similar to how Indigenous people have and continue to interact with the land. They are actions to conserve and restore ecosystems as a form of limiting climate change by preventing carbon loss from the land to the atmosphere. Nature has been capturing carbon for millions of years and by protecting natural ecosystems like peatlands and forests, we can ensure that these carbon sinks don't become carbon sources to the atmosphere, increasing greenhouse gas concentrations and worsening climate change. Restoring developed land to its natural state as wetlands and forests by returning natural water flow and planting trees, slowly repairs the capacity of the

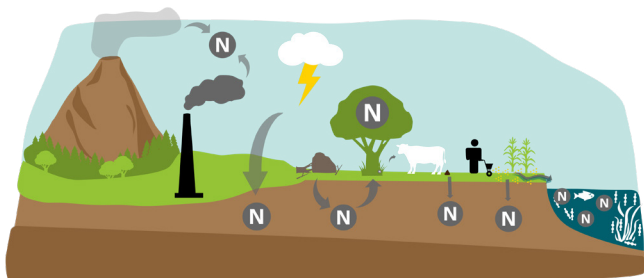
land to capture carbon from the atmosphere and return to its role as a carbon sink. Nature-based solutions can have added co-benefits like protecting food security, increasing biodiversity and preventing floods.



Net Zero

Net-Zero is a similar idea to carbon neutral but includes all greenhouse gases: carbon dioxide and methane from landfills emissions and agriculture; nitrous oxide from fertilizers; and gases used as refrigerants and anesthetics. Canada and over 120 countries have committed to

be Net-Zero by 2050. This means that our economy either emits no greenhouse gas emissions or offsets its emissions through actions such as tree planting or technologies that can capture carbon before it is released into the atmosphere. Net-zero commitment will require new technology and huge carbon offsets by rich countries to match global emissions that are unavoidable in bringing many millions of people out of poverty.



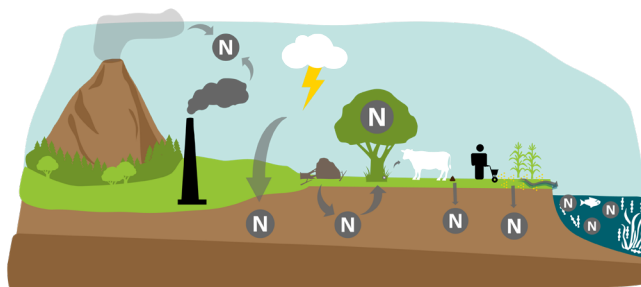
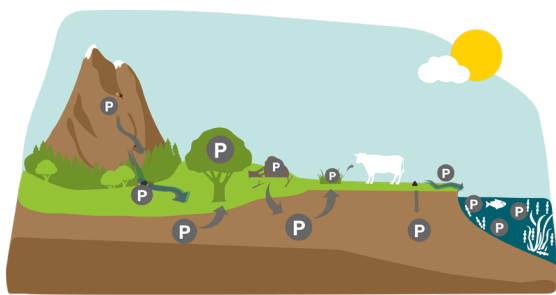
Nitrogen

Nitrogen (N) is one of the most common elements in the Universe. It is found everywhere on Earth, in the air, on the land, in the water, and in plants and animals. It is essential to life on Earth because proteins are made of nitrogen. Air is composed of 78.1% nitrogen.



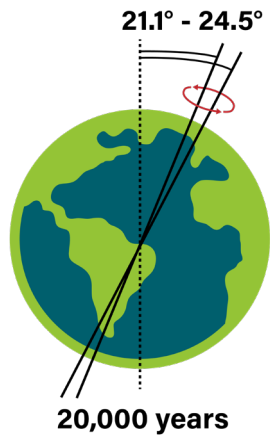
Nitrogen Oxides

A group of gases, some of which are greenhouse gases, containing nitrogen and oxygen and found in the atmosphere. Nitrogen oxides are emitted from vehicles and from power stations burning fossil fuels. In the atmosphere, nitrogen oxides react with the Sun to form smog.



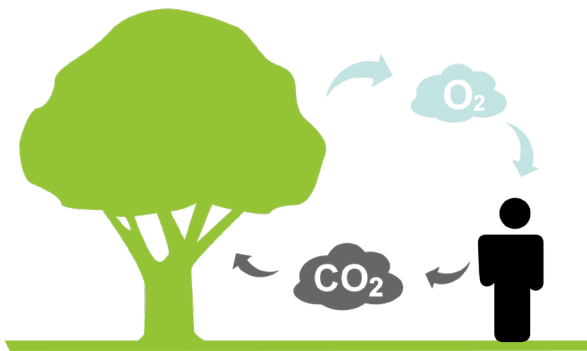
Nutrients

Substances like nitrogen and phosphorus, which plants and animals need to live and grow. At high concentrations, particularly in water, nutrients can become pollutants. For example, phosphorus becomes a problem when a high concentration in lakes from fertilizer run-off causes unhealthy growth of algae.



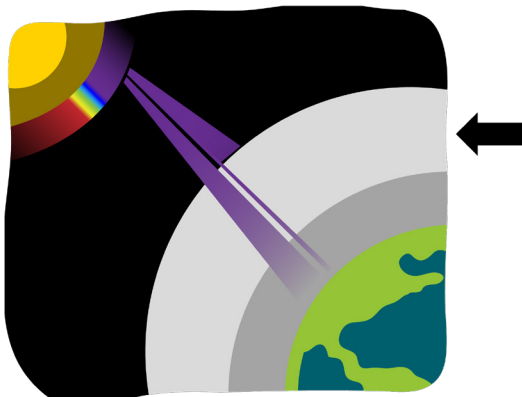
Obliquity (Tilt)

Obliquity (also called tilt) is the angle at which the Earth is tilted as it orbits the Sun. Today, the angle is 23.4 degrees and decreasing. It varies between 21.1 and 24.5 degrees over 20,000 years. Along with eccentricity and precession, it is responsible for the differences in temperature over thousands of years that cause Ice Ages and warmer periods.



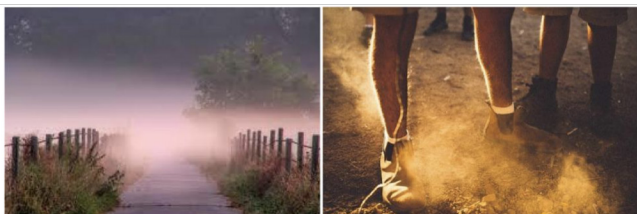
Oxygen

Oxygen (O₂) is a gas found in the air and dissolved in water on the Earth's surface. It is essential to life on Earth because all living beings are made up mainly of carbon and oxygen. Plants release oxygen as a waste product when they break down carbon dioxide to build sugars that fuel their growth. Until simple plants appeared on Earth and began to do this, there was no oxygen in the air for animals to breathe.



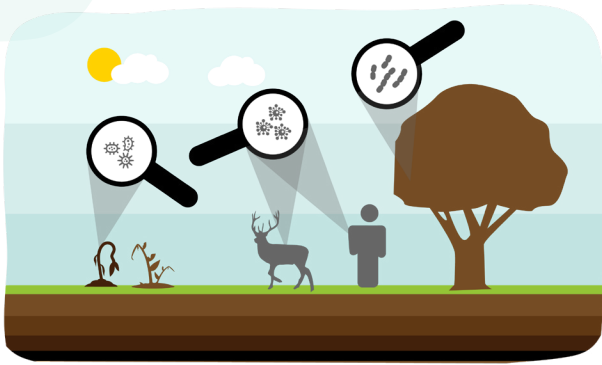
Ozone

Ozone (O₃) is a distinctive form of oxygen in the atmosphere with 3 oxygen atoms. Ozone is stable in the upper atmosphere and forms the Ozone Layer about 25 kilometres above the surface of the Earth which protects life from the damaging ultraviolet radiation from the Sun. Ozone near the ground caused by the burning of fossil fuels is a greenhouse gas and is considered a pollutant in the form of smog.



Particulate Matter

Dust-sized particles of solid or fine liquid suspended in the air, such as soot, dust, smoke, pollen, or mists. Particulate matter is part of air pollution from burning fossil fuels (especially coal, but also from gasoline vehicles), and has serious health effects like lung damage. Particles in the atmosphere reflect sunlight and cool the Earth, so, deliberately injecting them into the atmosphere has been suggested, by some people, as a way of reducing global warming.



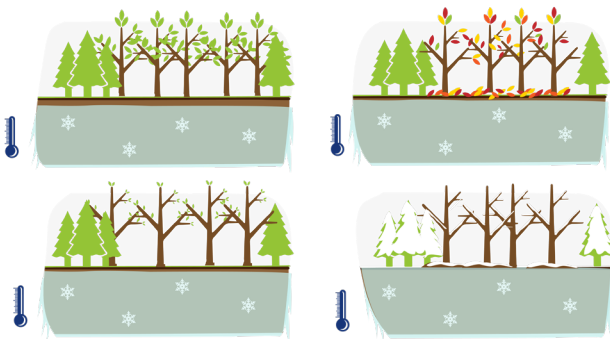
Pathogen

Microscopic organisms that cannot be seen by the human eye, such as bacteria, fungi, viruses, and parasites that cause disease in plants and animals, including humans.



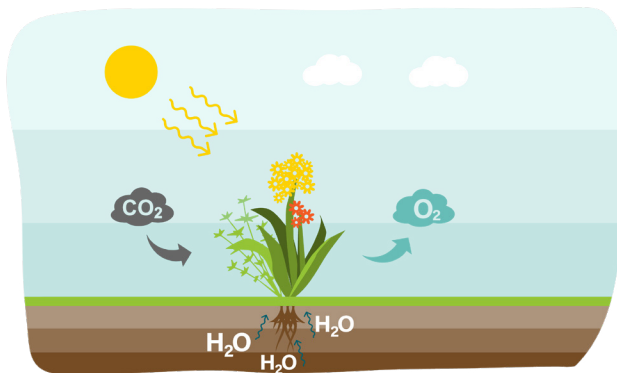
Peat

A slow accumulation of partially decayed vegetation, mainly peat moss, in wetlands. Peat can accumulate over thousands of years at just a millimetre a year and be as deep as 2 or 3 metres today. Most of today's peat began to accumulate in cold northern countries after the ice sheet of the last Ice Age ice began to melt about 10,000 years ago. There is concern that warming temperatures will result in accelerating the decay of peat and the release of methane, a greenhouse gas.



Permafrost

Permanently frozen ground that formed where the temperature of the ground remained at or below 0°C for several years. Zones of more northerly continuous, discontinuous and more southerly sporadic (or patchy) permafrost are recognized in Ontario. Permafrost is widely observed to be melting today.



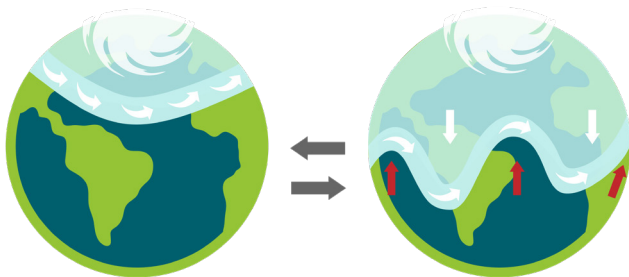
Photosynthesis

The process through which plants take carbon dioxide from the air to build sugars that fuel their growth. The waste product of this process is oxygen, which the plant then releases into the atmosphere.



Polar Front

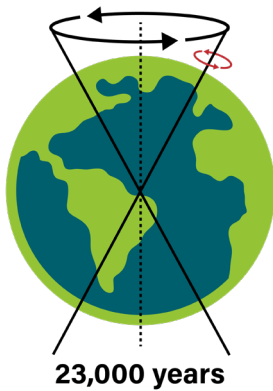
The boundary between the cold, polar air over the Arctic and warmer air to the south, located over the middle part of the northern continents. It is a very snake-like, meandering boundary with cold air pushing south from the Arctic and warm air pushing north from the south.



Polar Jet Stream

Fast-moving air flowing from west to east at about 10 kilometres above the surface along the polar front because of the difference in the pressure between the heavy, cold, polar air from the North Pole (high pressure) and the warm, mid-continent air to the south (low pressure). The smaller the difference in temperature between the warm and cold air masses, the slower

the air moves in the jet stream and the wavier the Polar Front becomes. This has resulted in the polar front moving more slowly and the wavy bends becoming stronger. A wavy Polar Front means hot air pushes north causing cold air to be pushed south. As the waves of the Polar Front pass over Northern Ontario in winter, temperatures can change dramatically from one day to the next.



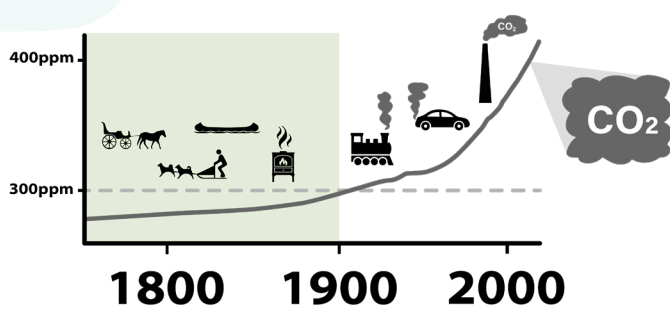
Precession

The wobble of the Earth around its axis over thousands of years. Precession can also be seen in other objects, like a spinning top. Precession happens at the same time as the angle of tilt of the axis changes and the orbit of the Earth around the Sun changes between circular and oval (eccentricity). Together, these movements are responsible for the differences in temperature on Earth over thousands of years that cause Ice Ages and warmer periods.



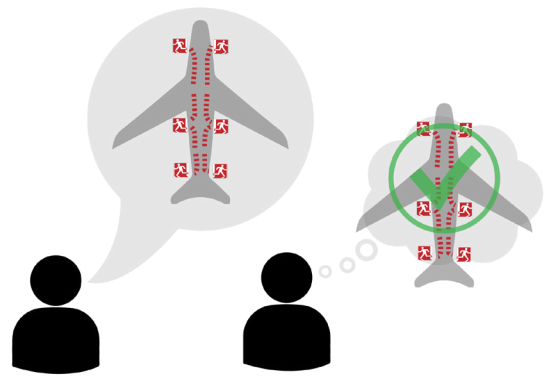
Precipitation

The release of water, in liquid or solid form, that falls from clouds and reaches the ground. Forms of precipitation include rain, snow, ice pellets, and hail.



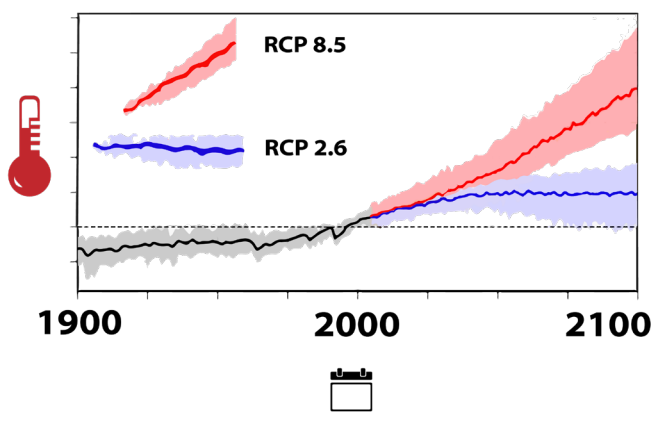
Pre-Industrial Era

The time in human history before 1900 when the use of machines was uncommon. In the climate change context, the levels of various substances in the atmosphere, like carbon dioxide, as well as the temperature in the pre-industrial era are often compared to now to show how the use of internal combustion engines and the burning of fossil fuels have impacted Earth's climate.



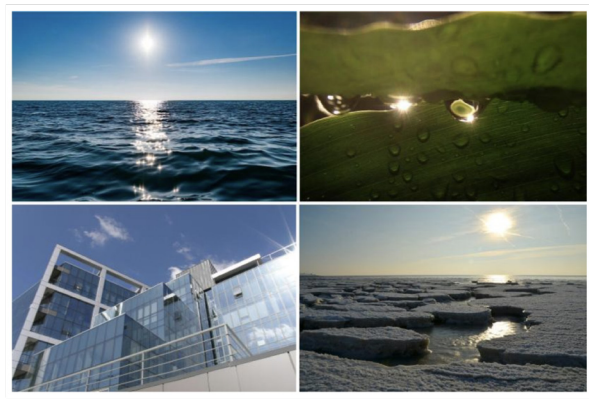
Preparedness

Actions taken to prevent, protect against, and lessen the impact of expected negative weather effects. For example, a community may have an evacuation plan in preparation for future flooding or smoke from a wildfire. Preparedness is an important part of good adaptation planning and often includes training.



Projections

In the context of climate change, projections are forecasts of future climate conditions or climate variables like temperature, rain, snowfall, frost-free days, and many more. Projections are currently being made for the 2050s and the 2080s. Climate projections come from complex climate models run on computers using calculations that take into account the circulation of the atmosphere and oceans, trends measured at weather stations in the past, and the consequences of different concentrations of greenhouse gases in the future known as Representative Concentration Pathways – RCP).



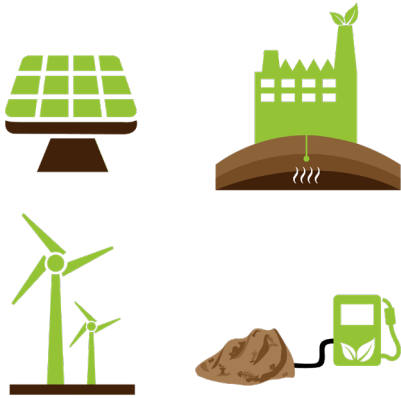
Reflectivity

Reflectivity is the ability of a surface to reflect sunlight. Albedo is a measure of reflectivity.



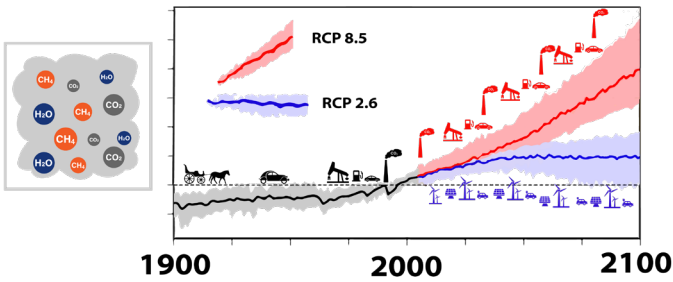
Reforestation

Planting trees to create forests on land that has previously supported forests but doesn't any longer for various reasons, but usually because of logging.



Renewable Energy

Energy resources that naturally replenish themselves. This includes biomass, geothermal, solar, wind, and hydro.



Representative Concentration Pathway (RCP)

A Representative Concentration Pathway (RCP) is the estimated change in greenhouse gas concentration in the atmosphere expected in the future usually based on three selected possible levels of human caused greenhouse gas emissions. RCPs range from an optimistic severe reduction in the current increase in greenhouse gases (RCP 2.6), to a future where greenhouse gases continue to increase with little reduction into the end of the century (RCP 8.5). The estimated amount of greenhouse gases represented by these pathways are then used to project future climate.

Resilience

Resilience is the amount of change that a human or ecological system can tolerate and still remain largely intact. It can be described as the capacity of a system to absorb, or even benefit from a change or a threat. Northern First Nations are very resilient in the face of changing environmental change having survived on the land for generations. Boreal forests are resilient against wildfire in the long run, having evolved with cycles of burn and renewal. Resilience is a broad term that includes adaptive capacity which is more narrowly focused on specific skills or tools that are used to contribute to resilience.





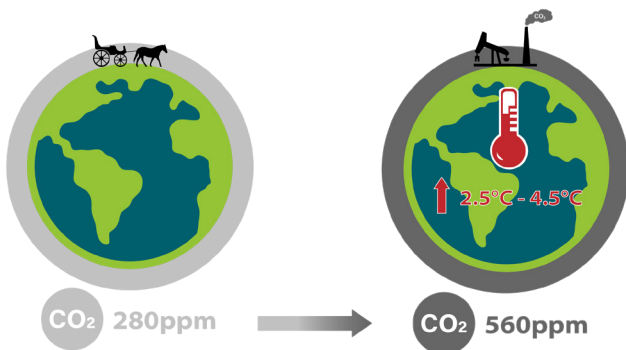
Risk

The potential threats to life, health and safety, the environment, and cultural values. Risk is usually evaluated by the exposure and vulnerability of a person or community to the threat, the likelihood of the threat occurring and the consequences if the threat did occur. For example, homes built on the flood plain of a river are at risk of flooding because they are in a low-lying area in which the water is likely to rise which could cause severe damage.



Sea Surface Temperature

The temperature of the surface of ocean water. Sea surface temperature can be measured by ships, buoys, drifters, and satellites. Daily records from satellites are available at several locations on the internet.



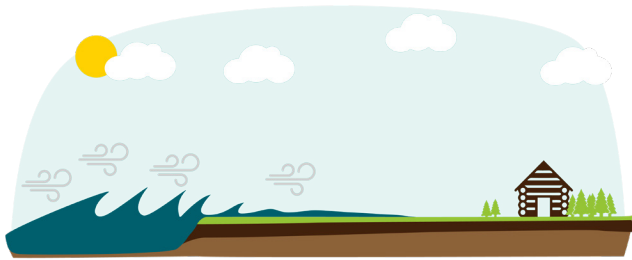
Sensitivity

In climate science, sensitivity of the climate is used for calculations of the increase in the average temperature of the planet if the concentration of carbon dioxide in the atmosphere doubles from its pre-industrial level of 280 parts per million. Those calculations range from 2.5°C to 4.5°C. Northern Ontario has proven to be about twice as sensitive as the planet as a whole. Concentrations have reached 415 parts per million in 2021, meaning we are about 45% of the way to doubling the concentration of carbon dioxide.



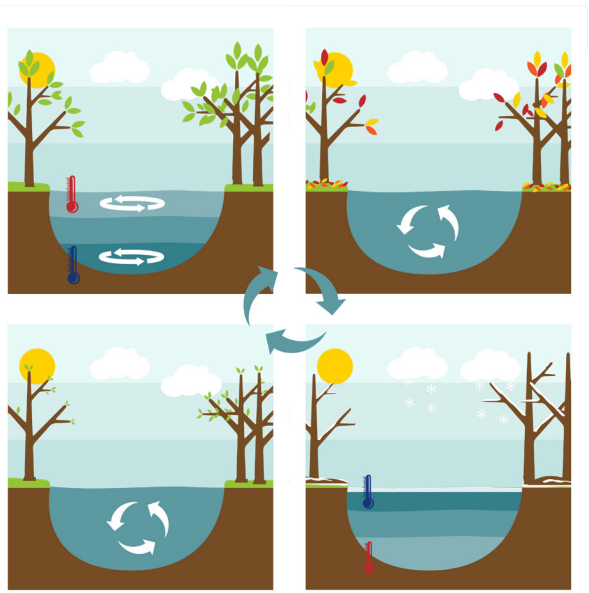
Snowpack

The seasonal accumulation of snow over the winter. Snowpack typically melts in the spring and summer in Northern Ontario.



Storm Surge

An unusual rise in seawater level during a storm beyond the height of the normal, predicted tide. Storm surges are largely caused by storm winds pushing the water onshore.



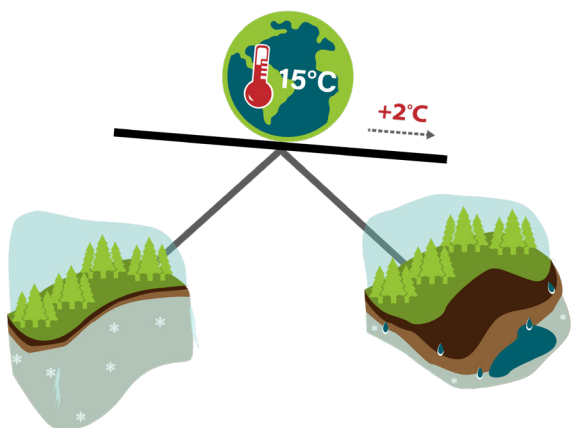
Stratification

The layering of water by temperature and density in lakes and other bodies of water. Fortunately, water is most dense at 4°C, so the water at the bottom of a lake in winter is above freezing and lakes don't freeze from the bottom up which would kill everything in them. Stratification changes with the season. In spring and fall, the lower and upper water in a lake will often mix. In summer, lighter, warm water stays at the surface of lakes while denser, cold water is at the bottom, shielded from the atmosphere. If this layering happens earlier in the year, as it might with climate change, then lower water could, in the future, become very low in the dissolved oxygen needed by fish.



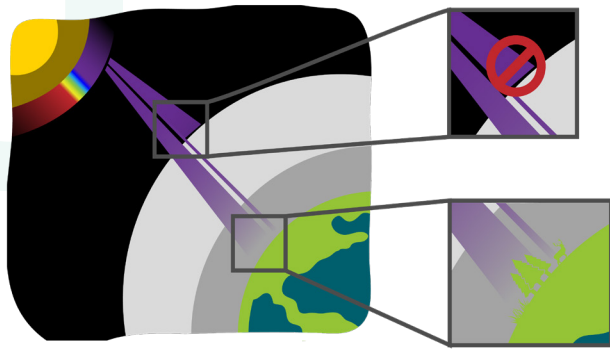
Stream Flow

The movement of water in streams, rivers, and other channels.



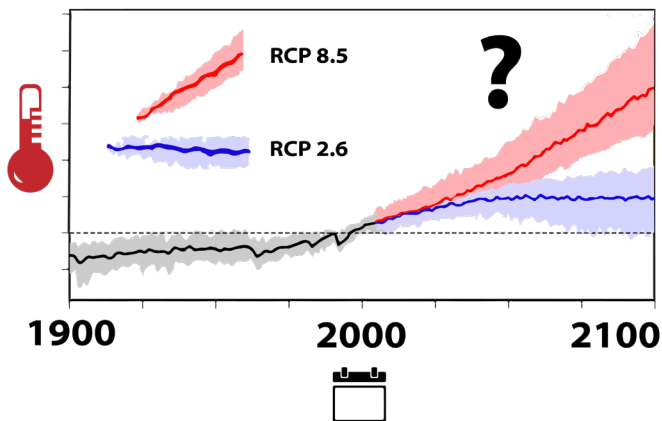
Tipping Point / Threshold

A change, which, when reached, may be impossible to reverse. Thawing of permafrost is one such tipping point which is likely to release large amounts of methane, a greenhouse gas, that will accelerate warming. With a warming Earth, permafrost is unlikely to return once melted.



Ultraviolet (UV) Radiation

Part of the energy that comes from the Sun, most of which is blocked by the ozone layer, but some does reach the surface and is needed by plants and animals for processes like photosynthesis and vitamin D production. However, too much ultraviolet radiation can burn the skin (sunburn), cause skin cancer and cataracts, and damage plants.



Uncertainty

Uncertainty is not being completely sure of something. In the context of climate change, we are sure that the climate is changing; change is a certainty. We are not sure exactly how much it will change and affect people; amount of change is an uncertainty. There is uncertainty in climate science is because the Earth's systems are complex and the amount of change will depend on how humans respond through mitigation.

For example, science agrees with Indigenous observations that winters are becoming warmer in the north and the ice road season is becoming shorter. From our current knowledge, we are sure that the ice road season will continue to shorten. What is uncertain is how fast ice will grow on a particular lake or if there will be certain areas that will become unsafe. Adapting to this uncertainty requires observations and sharing of knowledge with others about ice conditions.

Vulnerability

The degree to which physical, biological, social, and economic systems are at risk to the negative effects of climate change, especially as their vulnerability is amplified by the risk of more than one impact. Vulnerability is influenced not only by the climate, but also by the ability of these systems to adapt to changes (called the adaptive capacity).



Waste Water

Any water that has been affected by human use. This includes water from household activities, municipal systems, industrial activities, and agriculture.



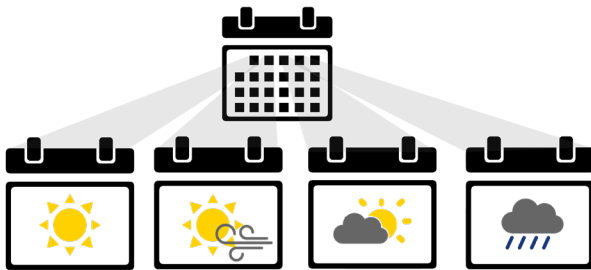
Water Security

The reliable access to as much fresh, clean water as is needed to sustain health, livelihoods, and the environment.



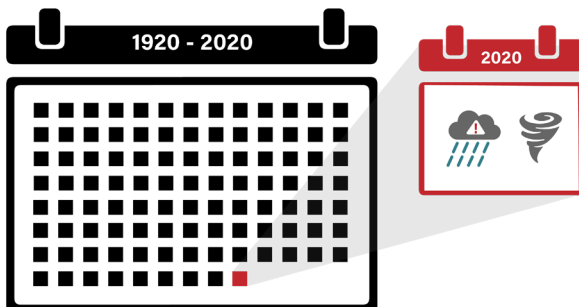
Water Vapour

Water vapour is water in its gas phase. Steam, from a hot shower or a pot of boiling water, is water vapour. Water vapour is an important part of the Earth's atmosphere. Liquid water evaporates from the Earth's surface and rises into the atmosphere, where it condenses into clouds and eventually falls back to the Earth's surface as rain or snow. Water vapour is also a greenhouse gas. As the planet warms due to climate change, the amount of water vapour in the atmosphere will increase due to positive feedback where warmer temperatures causes more water to evaporate.



Weather

Weather is the day to day conditions that a place experiences like wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. Weather typically changes over time and from season to season. Climate is the average weather an area experiences over a long period of time.



100 Year Event

An event that has a 1% chance of occurring in any given year or an event that will likely happen only once in 100 years. 100 Year Event might also be defined as the top 1% of severe events, such as the most severe rainfalls or most severe floods that a certain area has ever experienced. Because of climate change, 100 Year Events are now happening more often.

