



# Is Climate Change Good for Us?

To many people, the idea of global temperatures rising a few degrees may not seem like a big problem; to those who live in areas with cold winters it may even sound appealing. At a regional level, changes in climates will vary greatly and have diverse impacts. In this activity, students are encouraged to consider how climate change could impact them personally and to see how changes may affect their regions, wherever they live in British Columbia. The exercise reminds us that even with our advanced technologies, we are dependent on the Earth's natural systems for survival.

## Activity Time

- Warm-up: 5 -10 minutes
- Activity: 30 – 50 minutes
- Wrap-up: 10 - 20 minutes

## Setting

- Open area either indoors or outdoors
- Classroom

## Materials

- *Effects of Climate Change Chart* Black Line Master (BLM)
- Pencils

## Subject Areas

Science, Social Studies, Language Arts

## Keywords

Climate change, weather, region, predictability, organisms, agriculture, crops, tourism, economy, infrastructure, adaptation, interdependence, abiotic, biotic

## Prescribed Learning

### Outcomes (PLO) - Science

#### Life Science

- Analyse the roles of organisms as part of interconnected food webs, populations, communities, and ecosystems
- Assess survival needs and interactions between organisms and the environment
- Assess the requirements for sustaining healthy local ecosystems
- Evaluate human impacts on local ecosystems

#### Earth and Space Science

- Explain how the Earth's surface changes over time

### IRP Curriculum Organizers

#### Language Arts

- Oral Language
- Reading and Viewing
- Writing and Representing

#### Social Studies

- Human and Physical Environment

## Introduction and Background

We live in a world where we expect a certain amount of climatic predictability. In temperate interior regions, we expect warm summers and cold winters. In more southerly regions



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and along coastlines, we expect more rainfall in certain seasons than in others. For some regions, snow in May is typical; for others, annual droughts are the norm. Regardless of where we live, our activities, economics, and even the design of our communities' infrastructure are closely tied to predictable seasonal cycles and climatic conditions upon which we have come to depend.

One of the most important examples of our dependence on predictable weather patterns is found in agriculture. Plants have specific tolerances to the amount of snow or rainfall, degree of droughts, high and low temperatures, as well as a number of other variables. As a result, farmers rely on having predictable seasonal weather patterns when they determine what type of crops they will grow and when they will plant them.

Many other businesses rely on the weather as well. Recreational facilities and tourist attractions, such as ski operations, camping areas, and parks all depend on a number of optimal days to be able to stay in business. Think of how empty the beaches would be without the hot sunny days of summer, or how empty the ski hills would be if it rained most of the winter! Restaurants, hotels, transportation companies, and other enterprises depend on these weather-reliant businesses to bring in customers.

Within a region, the design of buildings, bridges, and even roads - the infrastructure of a community - is also based on an expected range of weather conditions. For example, in areas with high winds, new buildings are constructed to withstand the expected wind force. Flood-control dams are designed to handle a maximum amount of runoff within a certain period. Areas around rivers and lakes are often designated as being within the "100-year plan", meaning that based on past trends, the infrastructure is designed to withstand the most severe conditions that have occurred within the past 100 years (e.g., flood level and/or volume of flow). Land use decisions depend on these designations and, like agriculture and tourism, are based on a certain amount of weather predictability. Major changes in weather patterns, such as large increases in rainfall, especially over a very short period of time and associated with

spring snow melt, may increase the potential or degree of flooding in these areas.

If our climate does change, many other aspects of our lives could also change. Consider the impact of a hot, dry summer with many consecutive hot sunny days in a region that usually experiences rain about once a week. It may be great for us to have more sunny days than normal during summer vacation, but if there is more sun and higher temperatures, there is potential for increased evaporation of moisture from the soil leading to stress of the plants unaccustomed to these conditions. Would farmers benefit from these wonderful rain free, sunny periods? How might the resulting decline in crop yields affect the price and availability of food? What could happen if these weather conditions continued for a number of years? How would organisms in natural ecosystems fair if their major food source is affected?

These are the types of questions that this activity encourages students to consider – and seek answers for - when looking at climate change.

## Procedure

### Set-Up

This activity is a good cumulative activity and assumes students are familiar with the climate change concepts and the supporting scientific evidence. To provide this information, consider doing lessons *Greenhouse Effect: Part One and Part Two*, *Carbon Cycles!* and *Bearly Any Ice* prior to this activity.

### Warm-up

- 1 Check for the students' prior knowledge and understanding of climate change issues by posing the following question, "Is climate change good for us?" Ask them to consider all they currently know about climate change and the changes it may bring to their lives.
- 2 Instruct the students to form a line, with those who think climate change is definitely good for us (a solid, no-doubts "yes") at one end and those who think it is definitely not good for us (very firm "no") at the other end. Students who are less sure can choose a spot along the line that reflects





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their degree of (un)certainty. For those who don't have an opinion one way or the other, or don't feel they have enough information, they can stand at the center between each end. Assure all the students there are no "right" answers to this question.

- 3 Explain how the following activity will give them a chance to talk about their position and understandings while learning more about the possible impacts of climate change.

## Activity

- 1 This activity can be done individually, but students will benefit from discussing their ideas in pairs or small groups. Try to arrange groups to have students from both ends of the line (warm-up activity) to encourage a rich discussion. If necessary, remind the students of appropriate, respectful ways to communicate when sharing and discussing opinions and knowledge from differing points of view.
- 2 In their groups, ask the students to first share their response to the question "Is climate change good for us?" At this point, each student should only share their response; remind the students that the next step will help to guide and focus their discussions.
- 3 **Distribute** the *Effects of Climate Change Chart* to each group. Instruct the students to **discuss and record** what they think would be the consequences or "impacts" of each climate change scenario, using the questions in the headings as a starting point and guide. Note that the chart is very broad in scope, and does not expect students to quantify the changes, but only to consider general trends. Ensure all seasons are considered by assigning a specific season(s) to each group. You may want to add/remove scenarios to better reflect the potential changes in your region. See *Primer for predicted changes in regional climates; more may be obtained from government websites listed in Resources.*

The following provides the rationale for each question and indicates the kind of response you might expect from your

students for the climate change scenario of "Spring Season, More Rainfall":

**How would it affect me?** Allows the students to consider the possible impacts that may affect them directly. Example responses: "Ride my bike less often" or "More baseball or soccer games cancelled" or "Water may leak into our house."

**How would it affect my community?** Encourages the students to consider broader consequences such as the affect upon infrastructure, local business, and community life such as annual events. Remind students to consider the effects of storms and other weather events on infrastructure such as drainage systems, overpasses, electricity and so on. Example responses: "Good for local farmers with crops that like more water as they will need to irrigate less" or "Wash out bridge if river gets high" or "Local summer festival may make less money because more events will be rained out and fewer people will attend."

**How would it affect local ecosystems?** Assists the students to connect and further their understanding of ecosystems by considering the overall impact due to changes in some of the abiotic components (e.g., water availability, temperature, amount of wind). Students may still relate this to how it affects them personally, which is fine. Examples responses: "Increased local river flow so fish may not be able to reproduce successfully, resulting in less fish to catch" or "More soil erosion and my favourite tree with the rope swing over the pond may finally fall over. The woodpeckers won't be able to nest there this year."

- 4 Once the groups have completed their chart, discuss the responses as a class, comparing seasons. Summarize and record the main effects or one or two common effects. Add examples if the students' responses are missing key impacts. Ask if there are any categories in which there seems to be no negative effects. Discuss why.





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## Wrap-up

- 1 Lead a discussion around the question, “What adaptations would humans have to make if certain weather patterns became more common?” Use local weather patterns and events. Adaptations to consider include modifications to infrastructure such as buildings and roads, and changes in diet, dress, activities and transportation. This can be approached as a “What if...?” brainstorming exercise, or students may research actual trends and long-term predictions for their area. *See the Primer for general predicted trends; more specific trends may be obtained from government websites listed in Resources.*
- 2 Discuss with the students how plant and animal populations within local ecosystems may adapt over time to the changes in weather patterns discussed above. What might happen to local populations if the changes happen quickly? (*Answer: Some species may not be able to tolerate the changes and become extinct or extirpated*). Explore how this might affect the students and their community.
- 3 As a summary, ask the students to stand along a line again as they did in the warm-up. Observe and comment on changes of student position in the line. Ask students to share why they did or did not change position along the line.

## Assessment

- 1 Ask each student to record where he/she stood along the line both times in response to the question, “Is climate change good for us?” Full explanations why they did or did not move position the second time should be included. Look for evidence of increased awareness of the complexity of predicting possible effects of climate change and the range of impacts it may have.
- 2 Ask each student to choose a key plant or animal species in a local ecosystem whose survival may be affected by changing abiotic conditions due to climate change. After doing research, create a poster explaining how the habitat of the organism may change and the possible impact upon the food web and other relationships within the ecosystem. The poster should

indicate a clear understanding of habitat, the role of the chosen organism in the ecosystem’s food webs, and communicate impacts clearly, considering how the length as well as the quality of life of the species may be affected.

## Extensions

- 1 Have students research the climatic tolerances and potential effects of climate change on a local crop or natural resource. Gathered information might include the maximum and minimum amounts of rainfall and the range of temperatures that the crop tolerates, the number of frost-free days it requires for maturation, and its susceptibility to weather-influenced pests such as insects and fungus.

Compare these tolerances to the local normals for your area by obtaining charts showing annual precipitation, temperature, and sunny days from local weather offices or from the internet (see Resources). In areas where a specific crop or living resource is the cornerstone of the local economy, consider the economic, social and environmental consequences of lower harvests due to climate change (e.g., many people might lose their jobs; if people have less money to spend, local businesses will suffer; if local crops suffer, more food may have to be imported to the region, resulting in higher prices and greater consumption of fossil fuel).

- 2 Take a walk around the local neighbourhood, identifying aspects of the community and ecosystems that may be affected by climate change. Discuss what humans may need to do to reduce the impact. Research what action local government or other agencies may be taking to reduce the impacts.
- 3 The media frequently report extreme weather events that cause difficulties for individuals and local economies. Choose a current weather-related event and have the students identify the cause (e.g., rain for three weeks in a region that usually has rain once a month) and the result (e.g., mudslides, flooding of rivers, loss of life, houses,





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crops, safe drinking water). Ask the students if they think this is indicative of climate change or not.

- 4 Have students select several different regions of the world, including their own, and identify features of architecture, dress, diet and culture that may have developed as adaptations to the current climate.

### Source

This lesson has been used with permission from *Green Teacher* #61, Spring 2000. Author: Jackie Oblak is an environmental educator at the Bill Mason Centre of the Ottawa-Carleton District School Board in Ottawa, Ontario.

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Effects of Climate Change Chart

Group members \_\_\_\_\_ Season \_\_\_\_\_

Climate Change Scenario	How would it affect me?	How would it affect my community?	How would it affect local ecosystems?
More rain or snowfall			
Less rainfall or snowfall			
More sunshine			
Less sunshine			
Higher daytime temperatures			
Lower daytime temperatures			
Higher wind speeds			
More storms			
Other changes			