

# 50 Years of Change

## Secondary Level Climate Change Lesson Plan

**ACTIVITY INFORMATION:** In this lesson, your students will explore the topic of Climate Change over a 50-year period in your local region of the province.

**GRADE LEVEL:** 8-12

**DURATION:** Approximately 2 -3 80-minute periods

### RESOURCE MATERIALS:

1. Average Annual Temperatures for the last 50 years – locally (list of suggested websites and contact information provided in the content section of this lesson)
2. Computer access (with a word processing program and Internet)
3. Climate Change weblinks list (enclosed in this package)
4. Expository essay writing information available at:  
<https://www.grammarly.com/blog/expository-essay/>
5. One large piece of chart paper per student group

### DEFINITIONS:

The **climate** is the weather averaged over a long period of time. A descriptive saying is that "*climate is what you expect, weather is what you get*". Climate in a narrow sense is usually defined as the "average weather", or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind.

In the most general sense, **climate change** can be taken to mean changes over all timescales and in all of the components of climate (precipitation, clouds, temperature). Climate changes can be caused both by natural forces and by human activities. However, in recent usage, especially in the context of environmental policy, it refers more specifically to changes being studied in the present, including an average rise in surface temperature, or climate change.



## OBJECTIVES:

- 1) Knowledge – The students will be able to describe climate as it affects them in their local region and in accordance with the definition given above. For simplicity's sake, temperature will be the sole focus of this lesson. As an extension or enrichment, students could research precipitation and/or wind statistics, among other topics.
- 2) Skills – The students will become familiar with various sources of geographic information: almanacs, public library-government documents and online sources (see suggested information links below). Students will be able to use these sources to research their hypothesis and to cite in defense of their findings. Expository essay writing skills will be developed to complete this assignment.
- 3) Affective – The students will have the opportunity to develop group skills through researching collaboratively.

## PRESCRIBED LEARNING OUTCOMES:

- extract information from given graphs of discrete or continuous data, using: time series, continuous data and/or contour lines
- design different ways of presenting data and analyzing results, by focusing on the truthful display of data and the clarity of presentation
- describe methods of obtaining, visualizing, and analyzing local and regional information about the earth
- demonstrate an awareness that decisions made today will influence the future of society
- evaluate how human activity affects climate, including ozone depletion, global warming, and acid rain
- demonstrate the ability to use the Internet to access information from a variety of sources, academic, government, corporate, NGOs
- compose or create works of communication for specific audiences and purposes, including to entertain, persuade, or inform
- locate, access, and select relevant information from a variety of sources (including technological sources) for defined purposes



## INSTRUCTIONS:

1. Discuss the terms “climate” and “climate change”. See what definitions the students can provide for these terms and then provide them with the definition we will be using in this lesson.
2. As a whole class or in the small groups, have the students brainstorm ideas regarding where they might obtain data on climate. **Hint:** Try your local Environment Canada office, BC Ministry of Water, Land and Air Protection or the Weather Network, local media and non-profit groups
3. Instruct students to collaboratively obtain the average annual temperatures for their local community over the last 50 years.
4. Have the groups assess the data and choose an appropriate and effective means to graph and display their findings. As a guide, students can assess declines in average rainfall, higher temperatures, lower snowpacks etc. (*group members’ names in sub-title*).
5. Each group member then individually writes a one-page expository essay which discusses the findings their group came up with. Groups are encouraged to share ideas and assist one another in creating high-quality essays. See assessment criteria below.
6. Provide students with a list of project grading and assessment criteria prior to beginning research work. Students should be aware that each essay will be graded individually, but group members will receive a grade reflecting the average mark for the groups’ essays. In this way, individuals are motivated to help the groups achieve its best outcomes in this lesson.

## EXTENSIONS:

- Invite discussion and possible solutions to Climate Change within your own school or community. How can students take individual action to reduce their own climate change emissions? Have students conduct an experiment that charts their attempts to reduce emissions and measure their progress, using the EPA climate change calculator at <https://www3.epa.gov/carbon-footprint-calculator/>.
- Canadian site here:  
<https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/ghg-calculator.cfm>  
Global carbon footprint calculator:  
<https://www.carbonfootprint.com/calculator.aspx>
- Invite a classroom speaker from the BC Ministry of Environment or Environment Canada as well as an industrial representative, such as [the BC Oil & Gas Commission](#) or [Petro-Canada](#). Visit Petro-Canada's website to learn more about its climate change initiatives: <https://www.pumptalk.ca/2020/08/suncors-2020-report-on-sustainability-petro-canadas-contribution.html>
- [Students for Canada](#) is also a good source of unbiased, factual information that reflects youth views with videos and research.

- In addition to multiple reports about melting polar ice caps melting, what other predictions about climate can students find and research from the last 50 or so years? Acid rain, global warming, global cooling, population bomb, etc. Encourage students to look at research from various sides to see how these topics have numerous scientific opinions and data. Is the topic black and white or do students see conflicting opinions, and impacts associated with taking a particular “side” in their research? Here are a few sites below to get started:  
[http://archive.boston.com/news/globe/editorial\\_opinion/oped/articles/2007/08/15/hot\\_temperatures\\_on\\_global\\_warming/](http://archive.boston.com/news/globe/editorial_opinion/oped/articles/2007/08/15/hot_temperatures_on_global_warming/)

- “Driving the criticism of *The Population Bomb* (1968) were its arresting, graphic descriptions of the potential consequences of overpopulation: famine, pollution, social and ecological collapse. Ehrlich says he saw these as “scenarios,” illustrations of possible outcomes, and he expresses frustration that they are instead “continually quoted as predictions”—as stark inevitabilities. If he had the ability to go back in time, he said, he would not put them in the book.” ([Smithsonian Magazine Jan 2018](#))

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SECTIONS Q

**INNOVATION**

## The Book That Incited a Worldwide Fear of Overpopulation

'The Population Bomb' made dire predictions—and triggered a wave of repression around the world

Charles C. Mann  
January 2018

**THE POPULATION BOMB**  
DR. PAUL R. EHRLICH

**MOST POPULAR**

1. The Unmistakable Black Roots of 'Sesame Street'
2. Cavers Discover 200-Year Old Mine, Untouched Since the Moment It Was Abandoned
3. How to Deal With Work Stress and Recover From Burnout
4. The Real History Behind Starz's 'Becoming Elizabeth'
5. Wealth Is a Strong Predictor of Whether an Individual Pursues a Creative Profession

The book was published so hastily the fuse bomb pictured on the cover was “ticking.” Donny Bajahr

As 1968 began, Paul Ehrlich was an entomologist at Stanford University, known to his

1 *The Smithsonian Magazine*

Lesson plan prepared by Sandra Ulmer – Education Services Coordinator, FORED BC

**SCROLL DOWN FOR ESSAY GRADING CRITERIA**

## Essay Grading Criteria

### A range (80-100)

- clear development of a specific and challenging thesis
- evidence of a clear and individual response to the topic
- clear ability to expound upon a subject and to see implications as well as ambiguities, qualifications, etc.
- correct and complex sentence structures
- a style that flows easily, that is sophisticated yet unaffected
- proper paragraphing
- no grammar / diction / spelling errors
- proper documentation

### B range (70-79)

- clear development of a specific thesis
- reasonably sophisticated ideas
- a style that is not too wordy or vague
- correct (and sometimes complex) sentence structures
- correct punctuation
- proper paragraphing
- relatively few grammar / diction / spelling errors (with these few errors being minor)
- proper documentation

### C range (60-69)

- reasonably clear development of a thesis
- adequate development of ideas but the thesis statement may be too vague and / or the analysis relies to some extent on generalizations
- lack of supporting evidence or poor use / misuse of examples
- correct but simple, repetitive sentence structures
- proper paragraphing
- errors demonstrate a misunderstanding of one or more points of basic grammar (e.g. sentence fragments, agreement problems)
- proper documentation

### D range (50-59) § inadequacy in one or more areas

Any of the following could result in a "D":

- a vague thesis
- reasonably sound ideas obscured by poor presentation
- unsupported over-generalizations
- summary in the place of analysis
- lack of paragraph unity / coherence / development
- grammar / diction errors that compromise the clarity of sentences
- documentation errors

### F range (0-49) essay is basically unreadable

- simplistic ideas
- no individual response to the topic
- incoherent sentences
- poor / non-existent paragraphing
- inadequate documentation