

Fluctuations in the Price of Oil

http://www.ccge.org/resources/learning_centre/classroom_activities/oil_prices.asp

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Suggested Grade Level

Grades 11-12, first year university

Time

1 to 2 weeks

Standards Addressed

Human Systems, Global economic interdependence (identify and analyze the historical movement patterns of people and goods and their relationships to economic activity);

Geographic Skills

acquiring data online, and potentially organizing data in a table or spreadsheet, and analyzing data graphically

Materials

Online access to CANSIM, available through Statistics Canada's [E-Stat web site](#). This service is part of Statistics Canada's Data Liberation Initiative (DLI) that is available to registered schools and post-secondary institutions. Spreadsheet software with graphing capabilities, or graphing software can also be used but is not essential.

Overview

Over the past 3 years, the price of oil has varied greatly. From a low of \$114 per cubic metre (\$18 per barrel) in December 1998, the price of oil increased almost 3 fold to \$337 per cubic metre (\$53 per barrel) two years later. While the price has dropped recently, it is still displays considerable volatility due to world events. These fluctuations have affected the prices of a wide variety of consumer products including, most obviously and dramatically, the price of gasoline. This exercise introduces students to an online database (CANSIM) that contains information on the retail price of gas for most of Canada's largest cities and regional centres. Data can be downloaded from this site and graphed by hand or with spreadsheet or graphing software. During the exercise, teachers can ask students to reflect on the forces that affect the prices of oil and gasoline as well as their impact on Canada's economy. Teachers can ask students to also consider how fluctuations in the price of oil and gasoline can have positive affects in some provinces of Canada and negative ones in other areas.

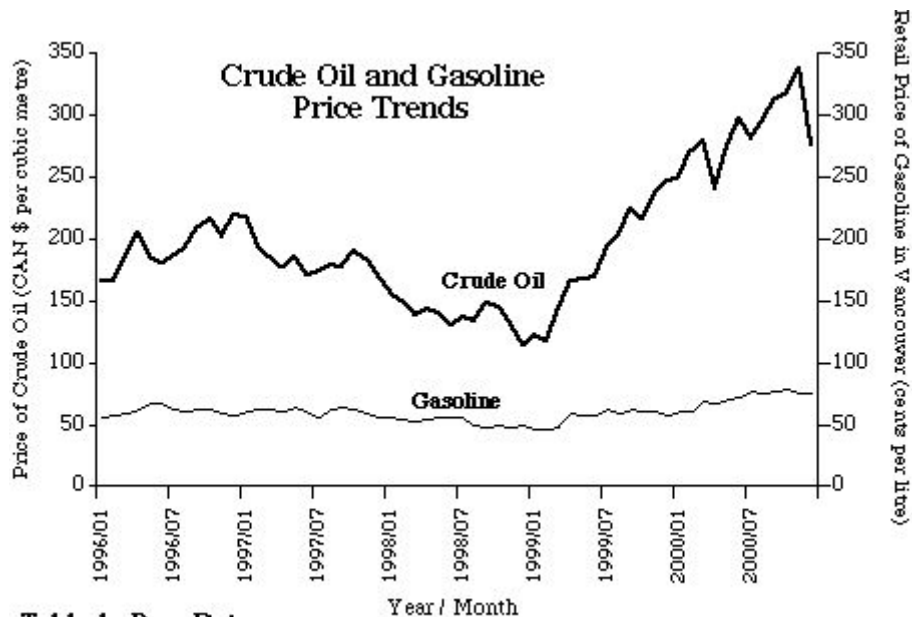


Table 1: Raw Data

Objectives

Students will be able to do the following:

- Define *wilderness*
- Communicate varying opinions on the preservation of wilderness
- Describe key players and events in the history of wilderness preservation
- Research and analyze one historical wilderness issue or event
- Design a newspaper from the year of their assigned wilderness event, linking it to politics, culture, and other historical events

Teaching Review

Oil is an extremely important resource. Some have even suggested that it is the most important commodity in our global economy. Since the early 1970s, oil has been at the cause or reason for economic recessions, wars, economic blockades, human rights issues, and, in Canada, debates between federal and provincial powers. Consumers are, furthermore, very sensitive to changes in the price of oil. This sensitivity in part reflects our reliance on gas powered automobiles and the curb side display of gasoline prices.

Data on the price of gasoline can be found in the CANSIM database. CANSIM stands for Canadian socioeconomic information management system and is available through [Statistics Canada's E-Stat service](#). It contains tables of data that describe how aspects of Canada's economy have varied over time. CANSIM is a large, complex database. Teachers may want to prepare individual lessons on how to find, manipulate, display and save tables before they ask students to complete the assignment.

CANSIM's data tables can be searched in three different ways: through a hierarchical topic list, through key words, and through table or time series numbers. The easiest method is to give students the table or time series number. The number for the "Average retail prices for gasoline and fuel oil, by city, monthly" table is 326-0009 . To use this number, click on the "Search CANSIM II" link on E-Stats **Table of Contents** page, click on the "Table Number" option and "Continue" on the next page, and then enter the table number and click continue.

On the search result page, students can select a city or cities, a type of gasoline, and a time period. I'd recommend selecting 1996 or earlier in the "From" option if students will be using

software to construct a graph. A longer run of data will make significant changes more apparent and give students more to interpret. However, if students will be asked to graph the data by hand, a shorter time period is advisable since the data is monthly. A three year period will generate 36 data points.

When the options are selected, click "*Continue*", then "*Time Series*" (Option 2) on the following page, and "*Continue*" on the next page. The resulting **Output specification** page provides display options. The "*Output format*" menu includes graph, table, and download options. The line graph is the best choice for gasoline prices. Teachers may want to explain what type of graphs are best for different types of data. Line graphs are best for averages or rates of a continuous time series. Bar graphs are used to display amounts that occur over discrete time periods. To display the data in a table, go back to the **Output specification page** and choose "HTML Table, time as rows" and then "Go". This finished table can be printed. To download data, go back to the Output specification and choose the "CSV (Comma-separated values) file for spreadsheet use" or the "PRN (Tab-separated values) file for spreadsheet use". Either file type can be read by common spreadsheets or graphing software.

The graphical display of data is an important geographical skill. Teachers should emphasize the need for titles, axis labels, and data units on the graph. Accuracy and neatness in the drafting of axes and plotting of data points is also critical. In addition, students should be encouraged to draw simple graphs. Three dimensional symbols, ornate type faces, and elaborate legends and backgrounds should be discouraged. Edward Tufte's advice to "erase all non-data ink" is appropriate.

There are several sites on the internet that will help students and teachers interpret their graphs. The Gulf War, the Asian financial crisis, severe weather, and OPEC supply decisions are notable influences. Students may also be encouraged to reflect on how price increases may have influenced people's transportation decisions.

Teachers in more senior grades can challenge students to examine the relationship between the price of crude oil and the retail price of gasoline. Critics of the oil industry claim that the relationship is weak and thus that the price of gasoline is principally determined by other factors. Oil companies make the opposite claim. Plotting oil and gasoline data on the same graph will furthermore provide an opportunity for introducing students to a data handling method called indexing. If crude oil and gasoline are plotted in their raw units, it is difficult to compare the trends because the magnitude of the values are very different (see Table 1). However, when the trends are indexed to a common value the similarities and differences in the patterns are much clearer (Table 2). In this case I converted both crude oil and gasoline prices to a 100 index by dividing prices by the first value in their respective series and multiplying the result by 100. More information on creating indexed values and handling data in general can be found in Chapter 13 ("Indices and Data Conversions) of my manual on Introduction to Geographic Data Analysis. It can be [downloaded for free from my website](#). Crude oil prices for January 1996 to December 2000 in comma separated values format can also be downloaded from this site. Students should compare the relative volatility of the trends and look for lags between the series.

Resources

1. [CANSIM](#)

2. Information about Canada's Oil and Gas Industry is available through the federal government's [Strategis web site](#). In particular, teachers should consult Strategis' *Sector Competitiveness Framework Series: Petroleum Products*. This page provides information about the nature of gasoline retailing in Canada and the factors influencing the supply and demand of gasoline.

A study of the *Canadian Retail Petroleum Markets* can also be downloaded from the Strategis site

3. Natural Resources Canada has a web site devoted to energy issues, [Energy in Canada](#)
4. James Laxer, [Oil and gas : Ottawa, the provinces and the petroleum industry](#), Toronto : Lorimer, 1983.
5. Peter McKenzie-Brown, Gordon Jaremko, David Finch, [The great oil age : the petroleum industry in Canada](#), Calgary : Detselig Enterprises, 1993.
6. [Industry review of fluctuations in the price of oil](#). Graphs showing the relationship between major world events and price fluctuations are included;
7. Edward Tufte, [The visual display of quantitative information](#), Cheshire, Conn. : Graphics Press, 1983.