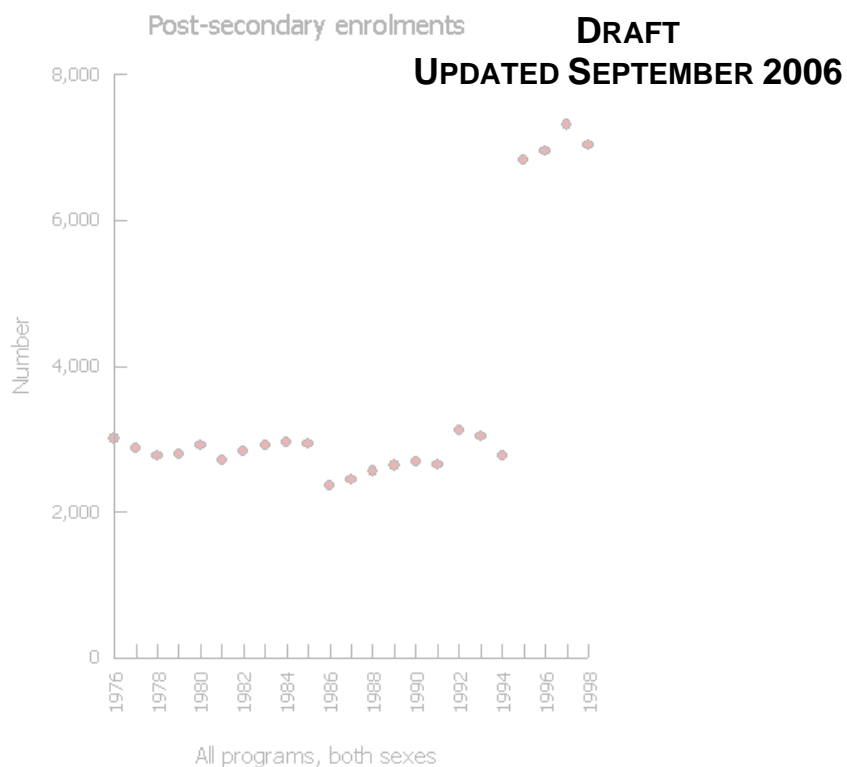


MATHEMATICS

GRADE 9

DATA MANAGEMENT USING E-STAT

NEW BRUNSWICK EDITION



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Teacher Notes

Lesson 1: Characteristics of Scatter plots

Purpose:

Students learned to construct scatter plots in Grade 8. In this lesson, the dispersion of points in a scatter plot is examined as we discuss the correlation that exists between the two variables.

Outcome:

F1 describe characteristics of possible relationships shown in scatter plots

Mental Math:

The mental math activity for this lesson could recall things necessary to remember about a coordinate system. Put a coordinate system on the overhead and ask students to:

- Identify the origin, x-axis, y-axis, quadrant I (etc.)
- Give directions on how to plot coordinates such as (3,2)

Another possible activity would be to display various types of graphs and ask students to identify them.

Materials:

- Activity sheets with samples of five scatter plots. (Answer key is provided as part of the sheets.)

Lesson Description:

Pass out the handout of the five graphs. Discuss the following ideas with the students. Give students some instructions on what they should find included in their notes.

1. Why are these considered to be examples of scatter plots?
2. Identify the two graphs that show a positive relationship.
3. Which of these show a stronger positive relationship? Why?
4. Identify the two graphs that show a negative relationship.
5. Which of these show a stronger negative relationship? Why?
6. What relationship exists in the remaining graph? Why?
7. Which graph(s) show an example of independent and dependent variables? Explain.
8. Which graph(s) show examples of continuous or discrete data? Explain.

Teacher Notes

Communications:

The terms to be introduced and explained in this lesson are: correlation, independent variable, dependent variable, continuous data, and discrete data.

Technology:

Students could create these scatter plots in E-STAT on the Statistics Canada website (<http://www.statcan.ca>) following the directions provided in the Technology section of this resource (pp 65-66). Remember that the purpose of the outcome is to be able to recognize the correlations.

Activities:

Give out another sheet of graphs (teacher-generated) and ask students to identify the correlation in each.

Additional Information:

Since these graphs were extracted from actual data on E-STAT, there should be discussion regarding the information that is being presented in these graphs. Teachers may wish to extract data that can connect to health and social studies outcomes.

If teachers want their students to use E-STAT at home, you have to give your students the E-STAT user I.D. and password. These should be available through your school board coordinator, or by clicking 'Contact E-STAT' on the left side bar from within E-STAT.

The following steps will lead you to a section on scatter plots where all teachers can find information for themselves or to share with students. The only drawback is that most of the examples given do not have any context.

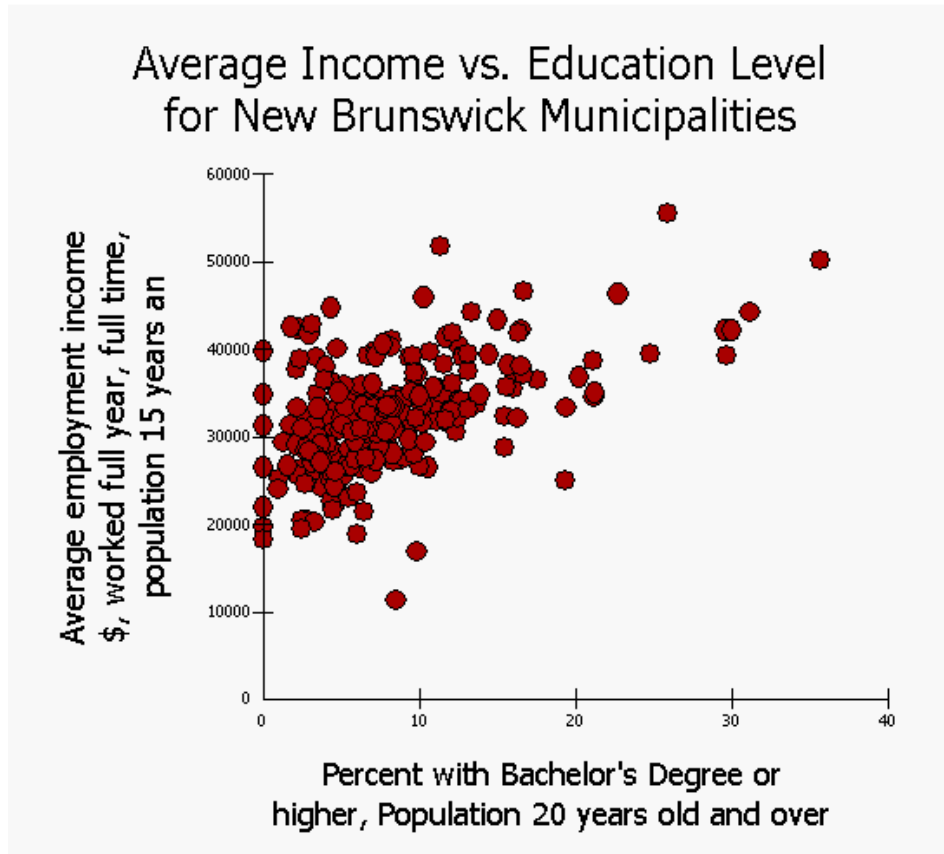
1. Go to <http://www.statcan.ca>
2. From the bar on the left, select **Learning Resources**
3. Select **Students**
4. Scroll down and select **Statistics: Power from Data!**
5. Under the heading **Graph** types, select **Scatter plots**

From the scatter plot screen referenced in #5 above, along the left side is "Make a graph!" Selecting this leads to instructions on how to create graphs. Graphs can actually be made at this site and copied into a word processing document. Teachers will find this useful when creating lessons or assessment materials.

Lesson 1: Activity Sheets – Scatter plot Examples

Graph 1: Average Employment Income vs. Percent of population over 20 with a completed university degree for municipalities in New Brunswick

Each point represents the average values for one municipality in New Brunswick.

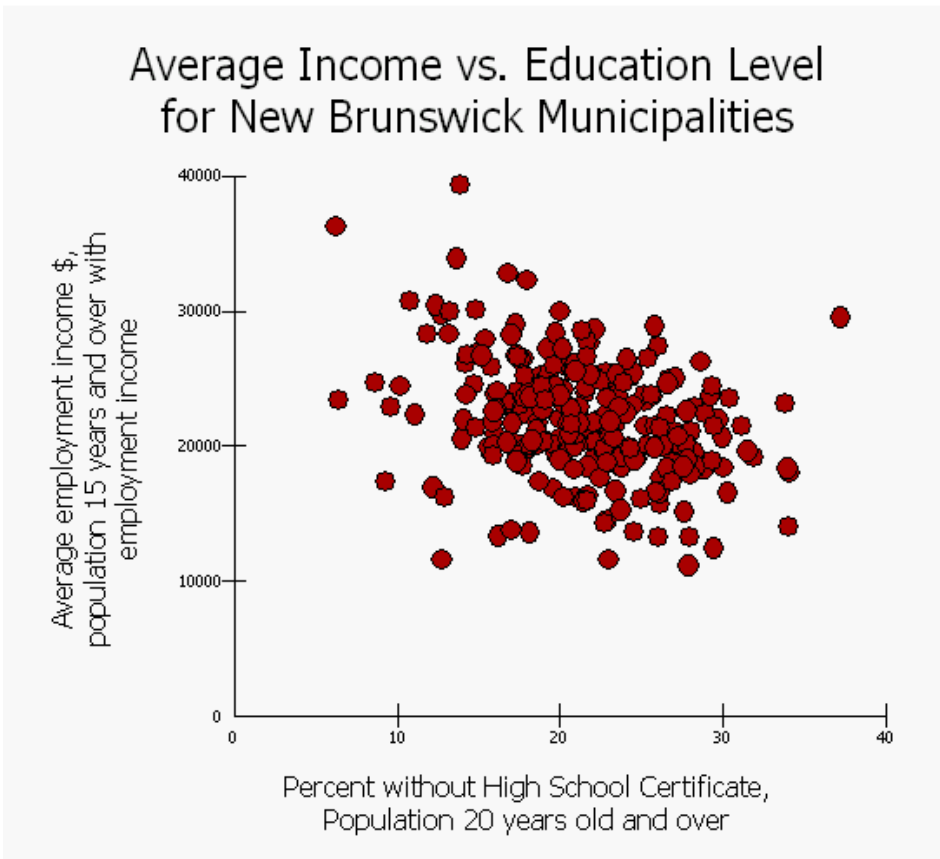


Source: Statistics Canada, <http://www.statcan.ca>, extracted June 22, 2006

Lesson 1:

Graph 2: Average Employment Income vs. Percent of population over 20 with some high schooling but without high school graduation for municipalities in New Brunswick

Note: Each point represents the average values for one municipality in New Brunswick.

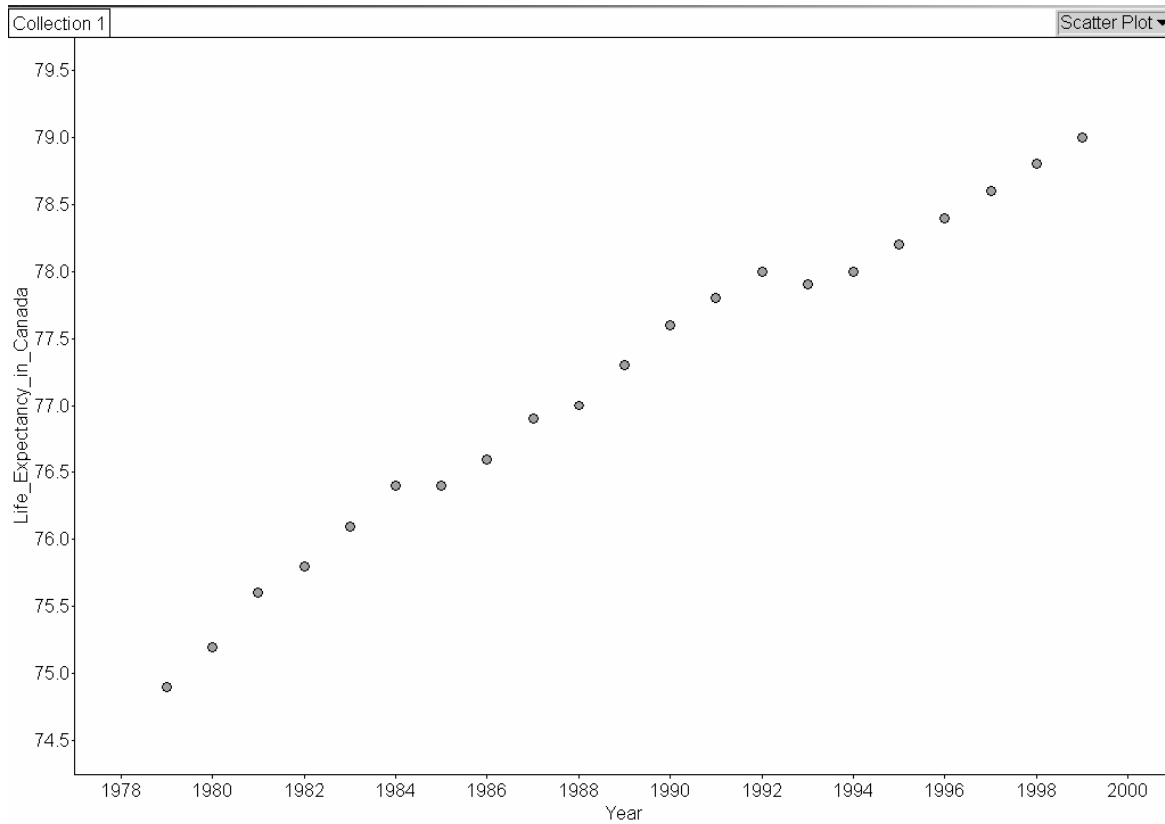


Source: Statistics Canada, <http://www.statcan.ca>, extracted June 26, 2006

Lesson 1:

Graph 3: Life Expectancy in Canada at Birth from 1979 to 1999

Each point represents the data for one year.

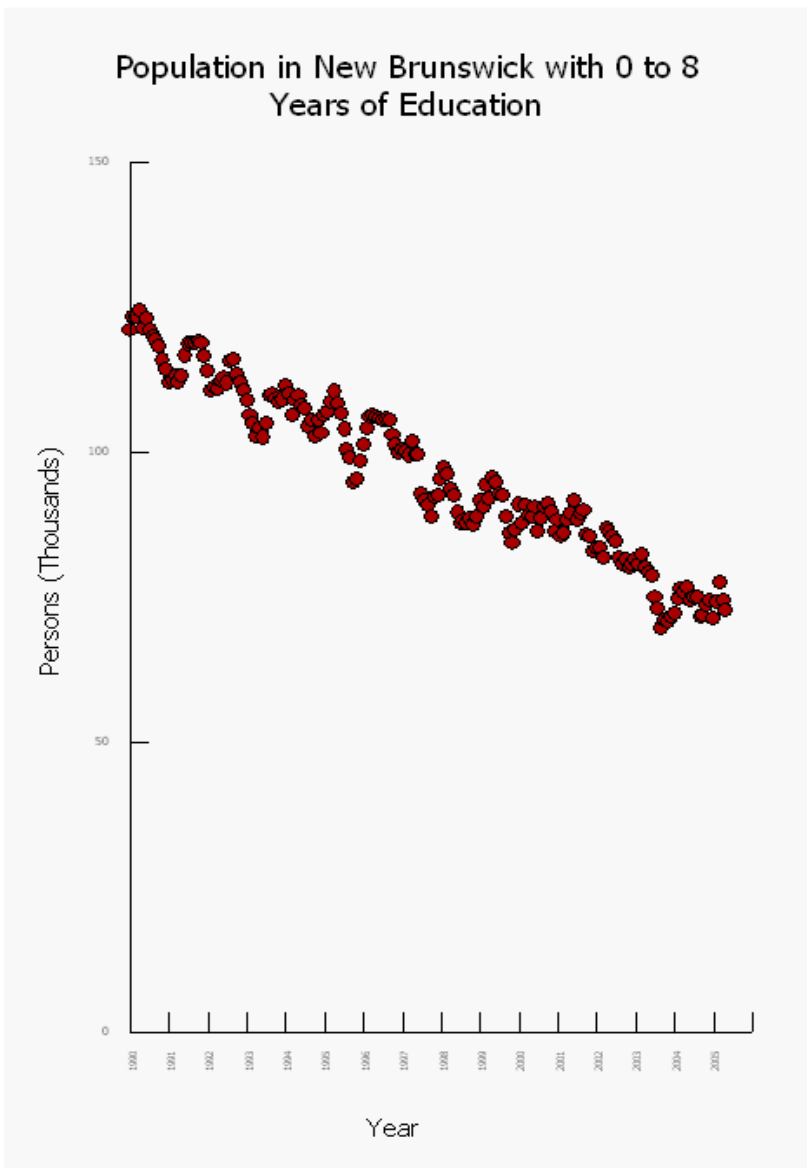


Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Lesson 1:

Graph 4: Population in New Brunswick with 0 to 8 years of Education since 1990

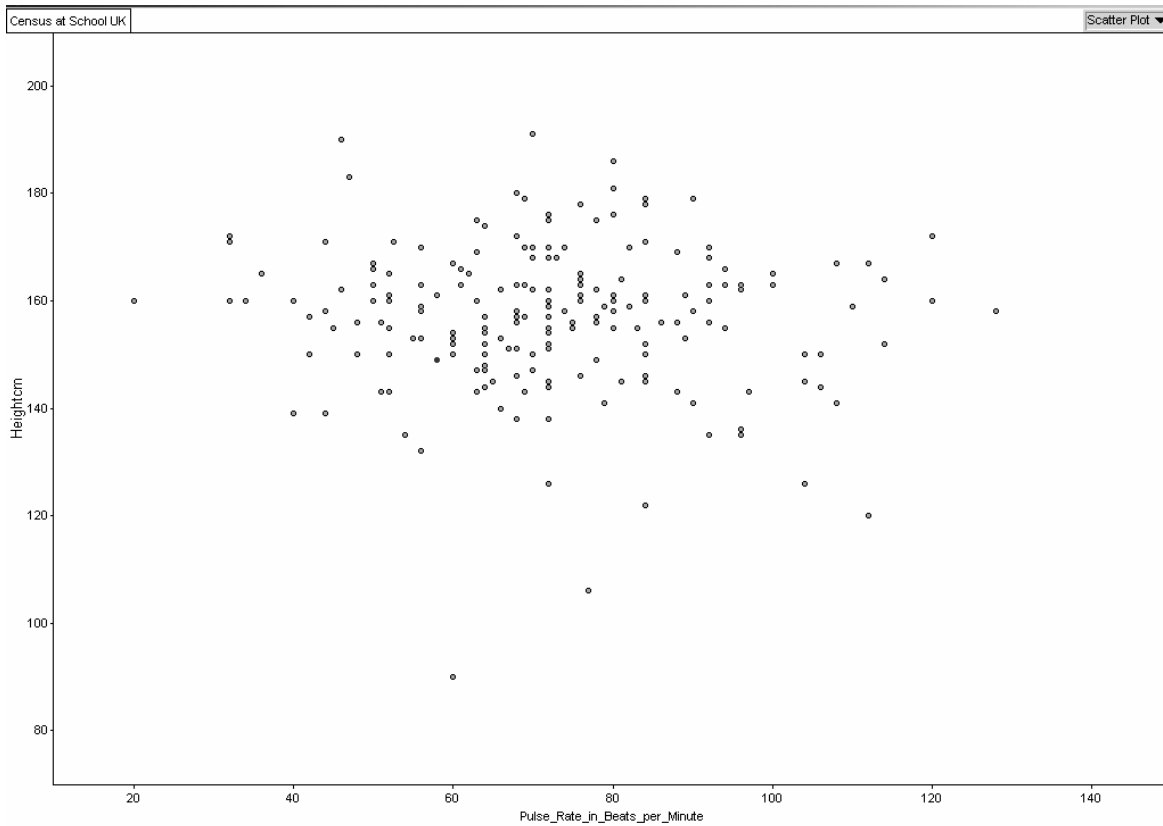
Each point represents the data from one month.



Source: Statistics Canada, <http://www.statcan.ca>, extracted June 26, 2006

Lesson 1:

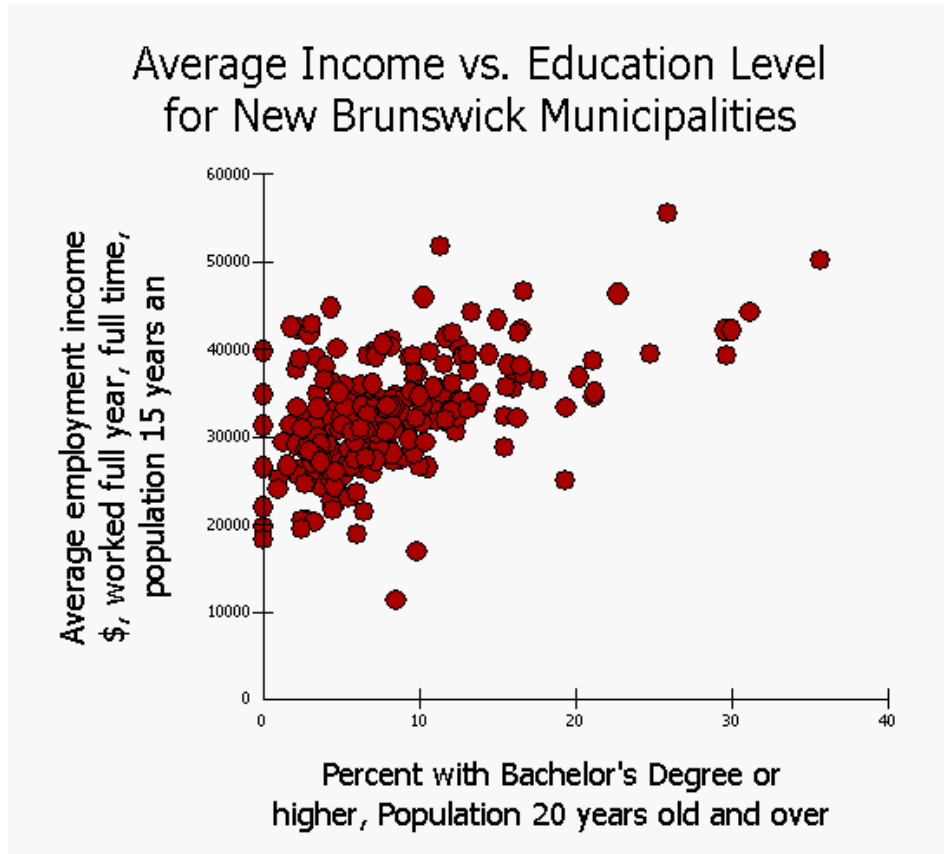
Graph 5: Height vs. Pulse Rate from Census at School Project



Source: *Census at School, United Kingdom, combined dataset from all participating countries*
<http://worksheet.censusatschool.ntu.ac.uk/random2/>
extracted March 25, 2004

Teacher Notes for Lesson 1 Activity Sheets

Graph 1: Weak Positive Correlation



Source: Statistics Canada, <http://www.statcan.ca>, extracted June 22, 2006

Census: 2001 Census

Profile: 2001 School Attendance, Education, Field of Study, Highest Level of Schooling and Earnings for New Brunswick municipalities

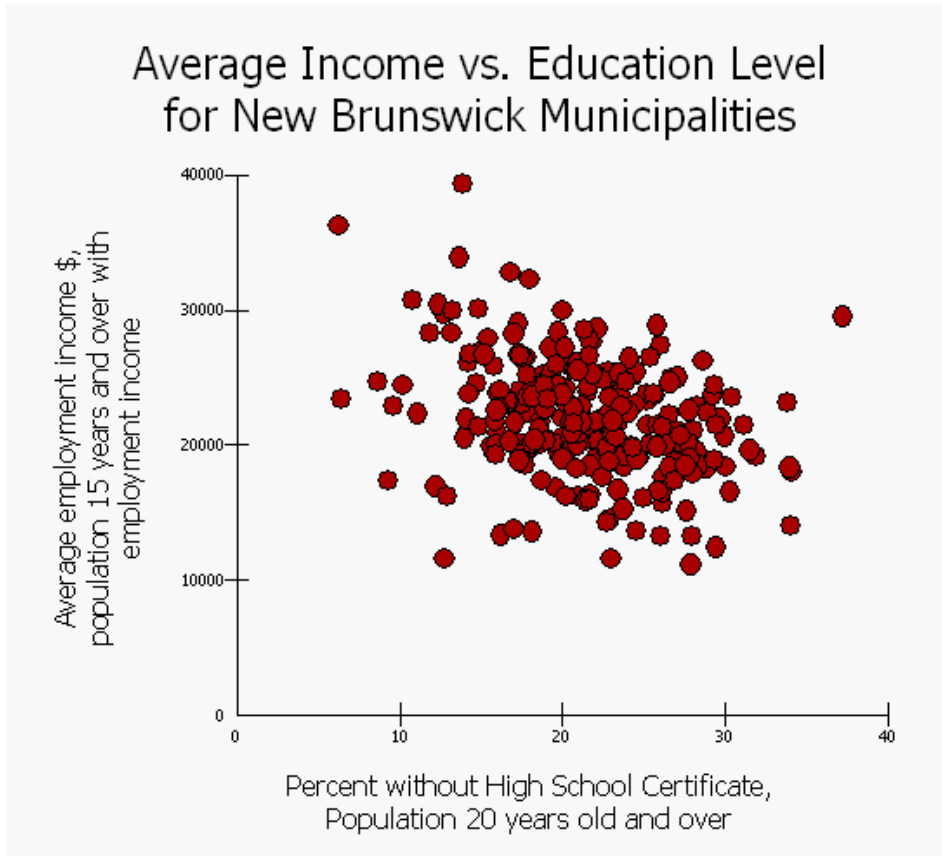
Manual intervention: we deleted municipalities whose average income was suppressed (i.e. 0) and modified the graph title.

File on disc:

- Spreadsheet (e.g., Excel): Inc_vs_educ_NB.csv

Teacher Notes for Lesson 1 Activity Sheets

Graph 2: Weak Negative Correlation



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Census: 2001 Census

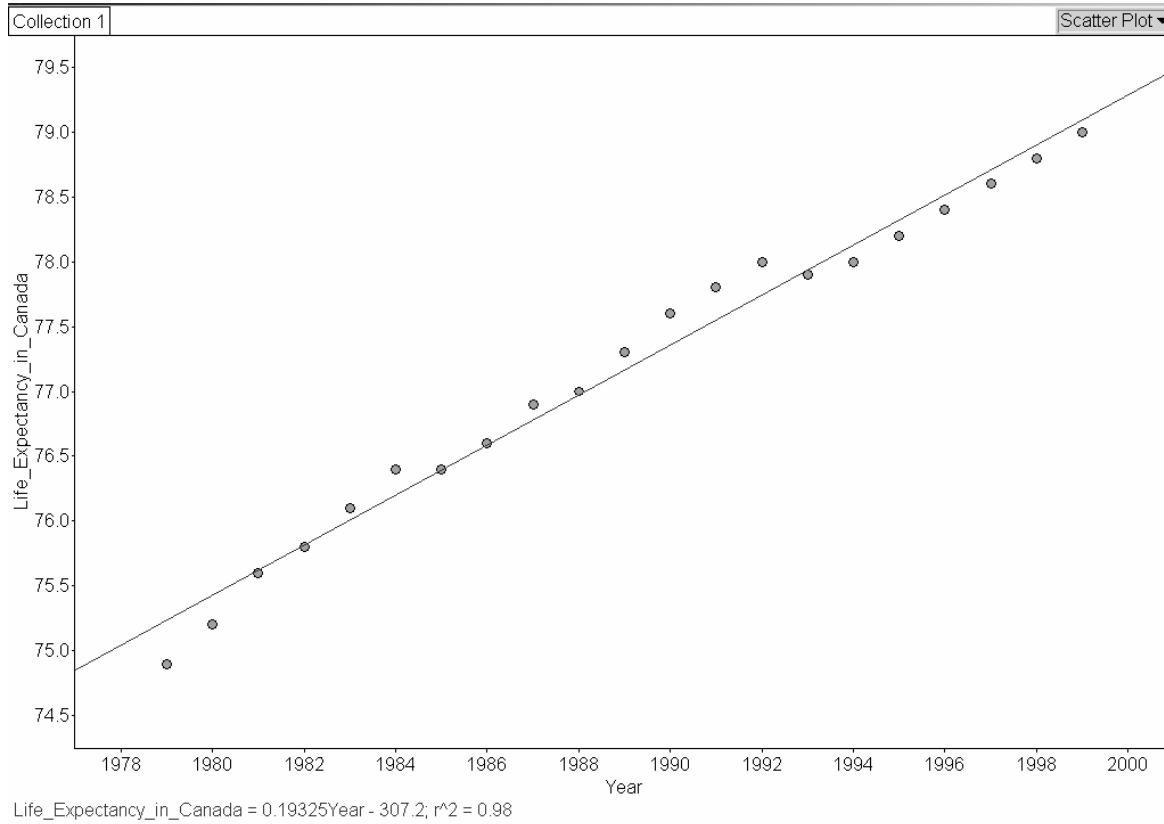
Profile: 2001 School Attendance, Education, Field of Study, Highest Level of Schooling and Earnings for Nova Scotia municipalities

Manual intervention: we deleted municipalities whose average income was suppressed (i.e. 0) and modified the graph title.

Teacher Notes for Lesson 1 Activity Sheets

Graph 3: Strong Positive Correlation

Each point represents the data for one year.



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Data: CANSIM Table 102-0025

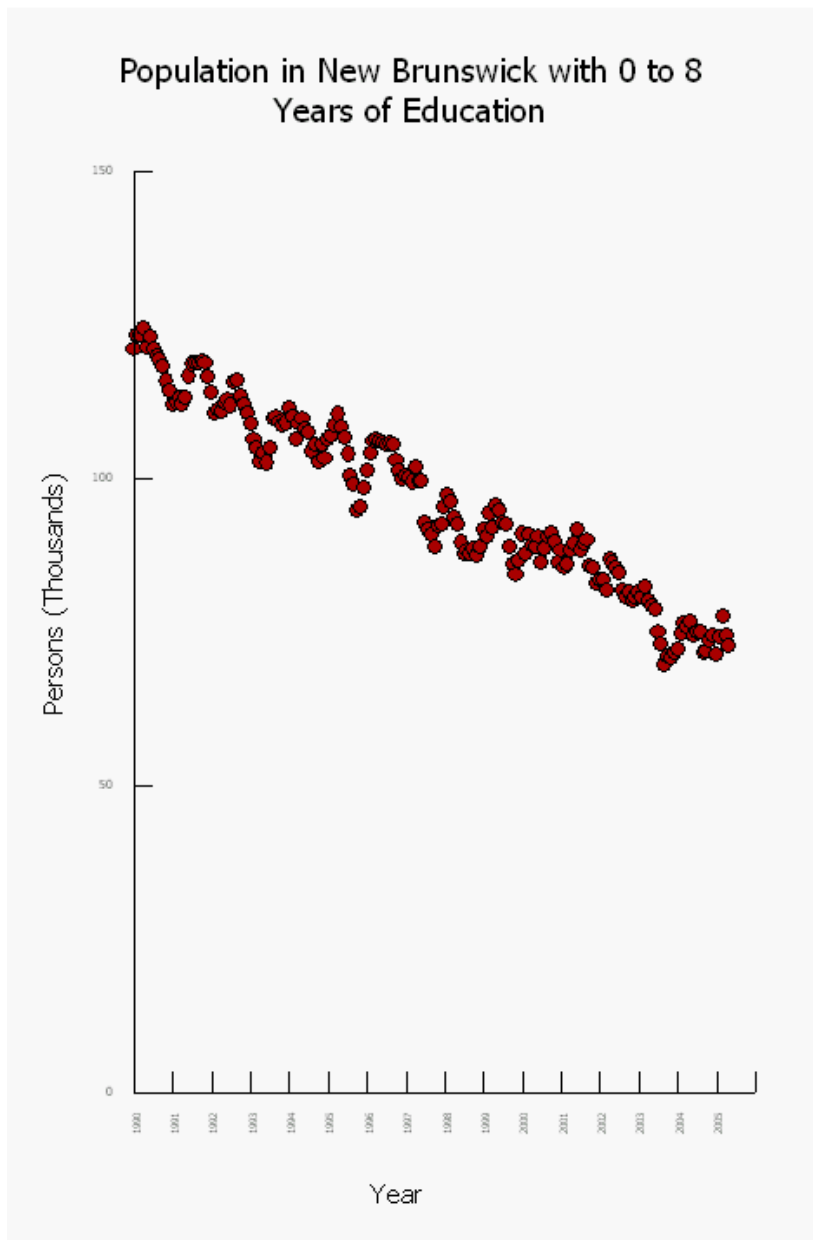
Comment: Dave: did you really create 2 new files to go with this graph? If not, the file names should be deleted.

Formatted: Normal

Teacher Notes for Lesson 1 Activity Sheets

Graph 4: Strong Negative Correlation

Each point represents the data for one month



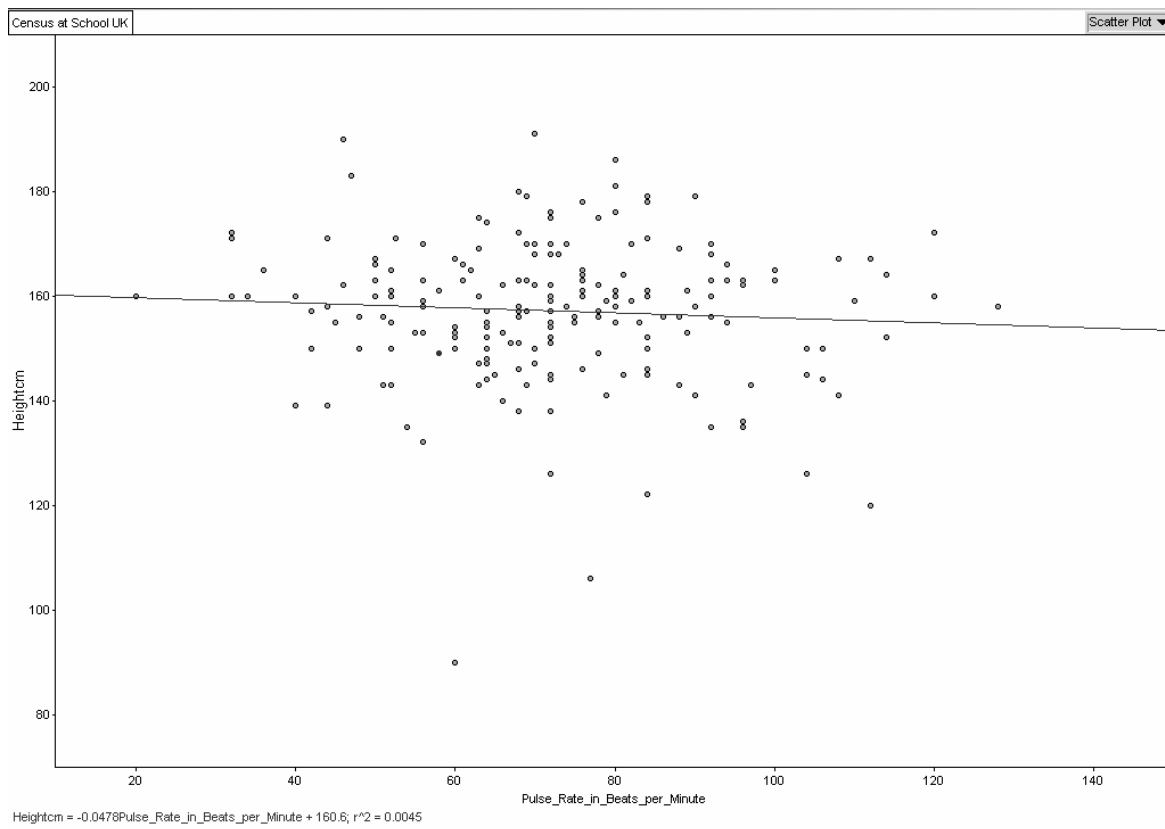
Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006

Survey: Labour Force Survey
Source: CANSIM Table: 282-0003
CANSIM Time Series: v2657643

Teacher Notes for Lesson 1 Activity Sheets

Graph 5: No Correlation

Each point represents the data for one student.



Source: Census at School, United Kingdom, combined dataset from all participating countries
<http://worksheet.censusatschool.ntu.ac.uk/random2>
See detailed content overview at: <http://censusatschool.ntu.ac.uk/files/UKCoding-phase3.doc>

Extracted: March 25, 2004

Dataset: UK Phase 3

File names on disc:

- Fathom: Census_School_UK_Ph3.ftm
- Spreadsheet (e.g., Excel): Census_School_UK_Ph3.csv

Teacher Notes

Lesson 2: Determining the equation of the line of best fit

Purpose:

In this lesson, students will be asked to first use the eyeball method to decide the line of best fit and then use the slope-intercept method to determine the equation of the line. C4 is an important outcome to prepare students for grade 10.

Therefore this activity should be completed manually first and then using technology such as graphing calculators or computer software such as Excel or Fathom, if available.

Outcome:

F2 sketch lines of best fit and determine their equations

Mental Math:

The mental math activity could be to show students two ordered pairs and have them mentally calculate the “change in y ” and the “change in x ” and then the slope. Repeat this process ten times.

Materials:

- Activity sheets from Lesson 1

Lesson Description:

Students might work on these scatter plots individually or in small groups. They have already worked with lines of best fit in Grade 8.

1. Using the five scatter plots from Lesson 1, ask the students to use the eyeball method to draw the line of best fit.
2. Ask them to determine the equation of their line using the slope-intercept method.
3. Have students state their equations and have a discussion concerning:
 - a) the reasonableness of their equation (e.g. is the slope reasonable)
 - b) why each student’s equation for the same scatter plot might be different
 - c) for which scatter plot(s) it is easier to determine the equation
 - d) for which equations do they feel more confident about the accuracy
 - e) for which section of the line of best fit they feel more confident

Ask some questions about each graph that would require the students to extrapolate data using their graph to answer.

Teacher Notes

Communications:

The terms to be reinforced in this lesson are: slope and intercept.
The terms to be introduced and explained in this lesson are: dispersion, interpolate, extrapolate, reliability, confidence. This is a great lesson for oral communication, as # 3 above asks students to justify their thinking.

Technology:

Students can use computer software, such as Fathom or spreadsheet applications (Excel or Lotus 1-2-3) to determine the line of best fit.

To save time, the data values for the examples shown can be exported directly from E-STAT into spreadsheets (Excel), Fathom software, or a graphing calculator.

Students could be shown how to use a graphing calculator to determine the line of best fit (if available).

Activities/ Assessment

The activity sheets can now be completed. Students should complete the questions 1 to 3 from the previous page for the scatter plots on the following pages. The originating data is also provided, and this might be used with other activities, if desired.

An alternative approach would be to have students create their own scatter plots from E-STAT and determine the line of best fit. Instructions for creating data through E-STAT can be found in the Technology section, pages 65 and 66.

Another possible approach would be to have students extract points from the graph and use a graphing calculator to complete the questions.

Additional Information:

E-STAT is on the internet at <http://www.statcan.ca> under **Learning Resources**. To access E-STAT from a computer located outside school, you may need a password. If needed, help is available online from <http://estat.statcan.ca> under **Help with this page** or you can access assistance by sending email to: e-stat@statcan.ca.

Lesson 2: Activity Sheets

Table 1: Male vs. Female Median Income for the North Shore of N.S.

Area Name:	Median income in 2000 \$ - males 15 years and over	Median income in 2000 \$ - females 15 years and over
Amherst	22,002	14,201
Antigonish	25,595	14,210
Antigonish, Subd. A	24,286	14,921
Antigonish, Subd. B	21,969	12,322
Canso	22,884	9,275
Colchester, Subd. A	21,257	13,427
Colchester, Subd. B	23,976	14,167
Colchester, Subd. C	27,739	13,465
Cumberland, Subd. A	15,931	11,727
Cumberland, Subd. B	21,415	11,976
Cumberland, Subd. C	22,444	14,518
Cumberland, Subd. D	25,143	12,725
Fisher's Grant 24	12,448	10,741
Guysborough	17,422	11,316
Millbrook 27	14,624	13,760
Mulgrave	18,392	11,755
New Glasgow	27,403	13,987
Oxford	24,069	14,433
Parrsboro	17,243	12,225
Pictou	23,583	13,229
Pictou, Subd. A	24,183	12,467
Pictou, Subd. B	27,413	12,129
Pictou, Subd. C	24,385	12,727
Pomquet And Afton 23	9,312	7,696
Springhill	21,495	13,950
St. Mary's	20,871	11,972
Stellarton	26,421	14,172
Stewiacke	28,281	13,796
Trenton	26,580	11,613
Truro	24,263	15,013
Westville	23,992	13,278

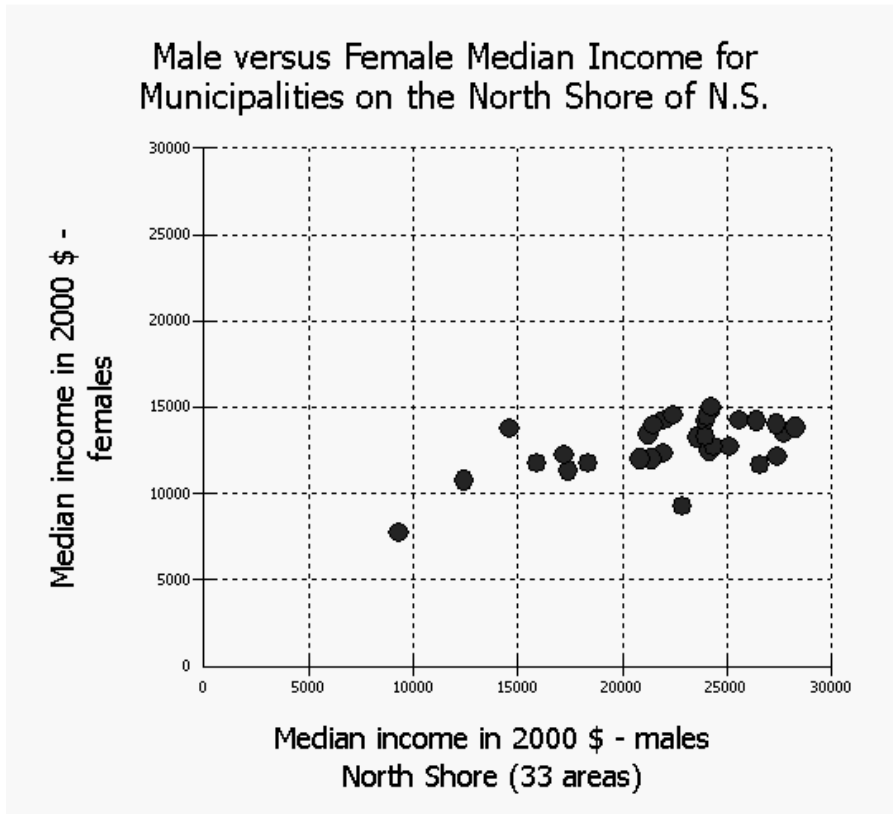
Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Census Table: Male versus Female Median Income for Municipalities on the North Shore of N.S.

Note: Two of the 33 municipalities for which the two median income values were 0 were dropped from the table above using the **Reduce/Sort Geo List** button.

Lesson 2:

Graph 1: Male vs. Female Median Income for the North Shore of N.S.



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Note: Each point on the graph above represents the male and female median income values in the year 2000 for one of the municipalities in the North Shore area of Nova Scotia.

Census: 2001 Census

2001 Census database used: Provinces, Census Divisions, Municipalities

Profile: 2001 Income and Social and Economic Characteristics of Individuals, Families and Households; Housing Costs and Religion

Geography: Census Subdivisions in Atlantic Canada – 2001 - NS – North Shore (33 areas)

Characteristics:

- Median income in 2000 \$ – males 15 years and over
- Median income in 2000 \$ – females 15 years and over

Modify graphic option selected: Equally-scaled axes on scatter graphs

Lesson 2:

Table 2: Infant mortality rate for N.B. since 1979

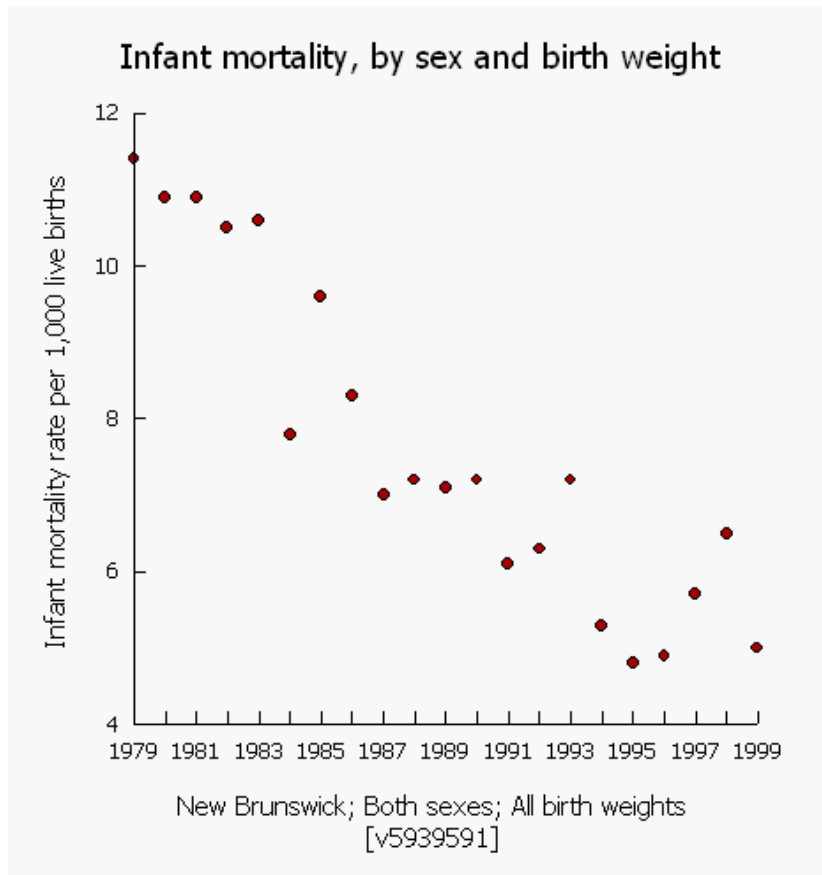
Year	Infant mortality rate per 1,000 live births (NB)
1979	11.4
1980	10.9
1981	10.9
1982	10.5
1983	10.6
1984	7.8
1985	9.6
1986	8.3
1987	7.0
1988	7.2
1989	7.1
1990	7.2
1991	6.1
1992	6.3
1993	7.2
1994	5.3
1995	4.8
1996	4.9
1997	5.7
1998	6.5
1999	5.0

Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006

Table 102-0030 - Infant mortality, by sex and birth weight, Canada, provinces and territories, annual

Lesson 2:

Graph 2: Infant mortality rate for N.B. since 1979



Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006

Survey or program details:

Vital Statistics – Birth Database – 3231
Vital Statistics – Death Database – 3233

Geography: New Brunswick

Sex: Both sexes

Birth weight: All birth weights

Characteristics: Infant mortality rate per 1 000 live births

Lesson 2:

Table 3: Age-standardized mortality rate by cause of death and sex

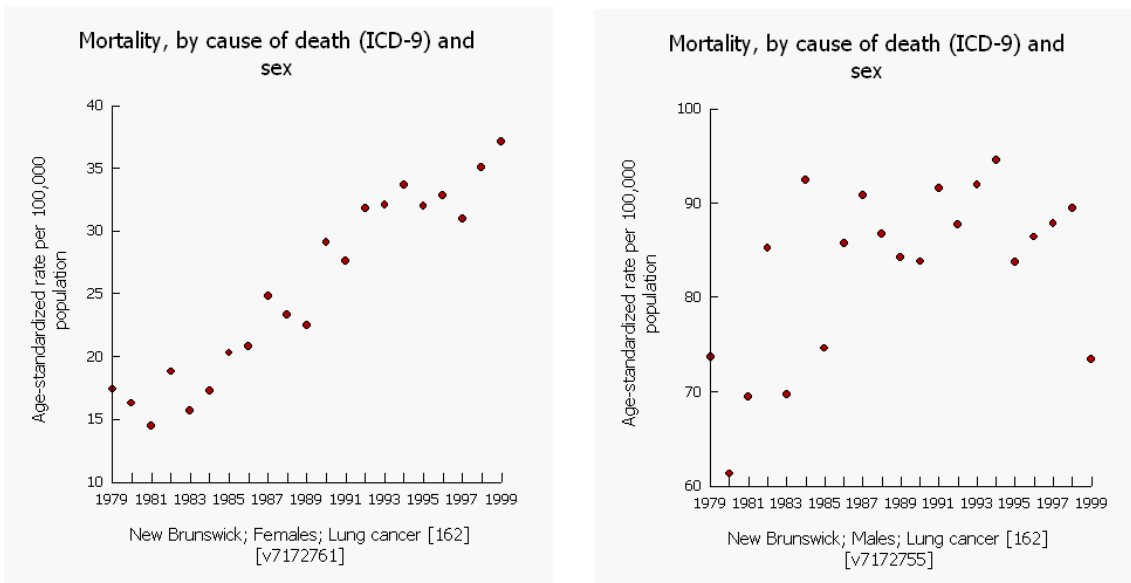
Year	Males	Females
1979	73.7	17.4
1980	61.3	16.3
1981	69.4	14.5
1982	85.2	18.8
1983	69.7	15.7
1984	92.4	17.3
1985	74.6	20.3
1986	85.7	20.8
1987	90.8	24.8
1988	86.7	23.3
1989	84.2	22.5
1990	83.8	29.1
1991	91.6	27.6
1992	87.7	31.8
1993	91.9	32.1
1994	94.5	33.7
1995	83.7	32.0
1996	86.4	32.8
1997	87.8	31.0
1998	89.5	35.1
1999	73.4	37.1

Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006

Table 102-0026 - Age-standardized mortality rate, by selected cause of death and sex, Canada, provinces and territories, annual

Lesson 2:

Graph 3: Age-standardized mortality rate by cause of death and sex



Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006

Survey or program details:

Vital Statistics – Death Database – 3233

Estimates of Population by Age and Sex for Canada, the Provinces and the Territories – 3604

Geography: New Brunswick

Selected causes of death (ICD-9): Lung cancer

Teacher Notes

Lesson 3: Examining curves of best fit

Purpose:

In this lesson, students will examine scatter plots that are not linear. They can use a piece of string to try to determine the curve of best fit. It is not the intent that they have to determine the equation of the curve. Tables have also been included so teachers can revisit the ideas in outcome C3, that is, to examine the idea of common difference in the table of values.

It should be noted that when choosing social data, it is very rare that it can be modeled exactly by a mathematical function, such as a graph. However, it can still be useful to examine this data using a mathematical model.

Outcome:

F3 sketch curves of best fit for relationships that appear to be non-linear

Mental Math:

Students can review the idea of common difference by being given a value and asked to mentally add on or subtract the same value 5 times. For example, start with 12 and increase by 4 five times, start with 0.3 and increase by 0.2 five times, and start with 6 and decrease by 5 five times. This would be a good lesson to do as a three second response.

Materials:

- Activity sheets with graphs and tables

Lesson description:

1. Discuss the meaning of Graph 1: Average value of dwellings vs. Unemployment rate, for counties in New Brunswick, based on data from the 2001 Census of Population and ask if it is linear. Ask if it is increasing or decreasing. Have the students use the table of values to support their response.
2. Have students sketch a curve of best fit for the graph, pointing out the fact about social data that was mentioned in the purpose. Also point out that because we are dealing with social data, patterns such as common difference are not visible in the table.
3. Ask questions that will require students to interpolate, extrapolate, or make decisions about the graph. (e.g. How might a higher unemployment rate affect the value of housing prices in a region?)
4. An additional table, containing the same data information from the 1996 Census, is provided for extension activities such as comparing the changes in the data over the two census collections.
5. Repeat the first three steps for Graph 2: Female Enrolments in Engineering and Applied Sciences.

Teacher Notes

6. Explore Graph 3: Births in Canada, 1946 to 2002 and its meaning. There are two significant sections of this graph. The first part of the graph, which is also provided in Graph 4: Births in Canada, 1948 to 1968, resembles a quadratic relationship. Ask the students to sketch a curve of best fit. Examine the table of values for any patterns.
7. The second section in Graph 3: Births in Canada, 1946 to 2002 shows linear relationships, one positive and one negative. Ask students to sketch the lines of best fit and calculate the equations for these lines.
8. Students could be asked to write a paragraph explaining the pattern of births in Canada from 1946 – 2002.

Communications:

This is a great lesson to ask students to complete a written assignment where they explain the meaning of a graph. See Instruction 7 in the lesson directions above.

Technology:

All of these graphs can be accessed through the Statistics Canada website if teachers wish to recreate them. The instructions are included at the end of the set of graphs. (See pages 31 to 33)

Lesson 3: Activity Sheets

Table 1: Unemployment Rate vs. Average Value of Dwelling

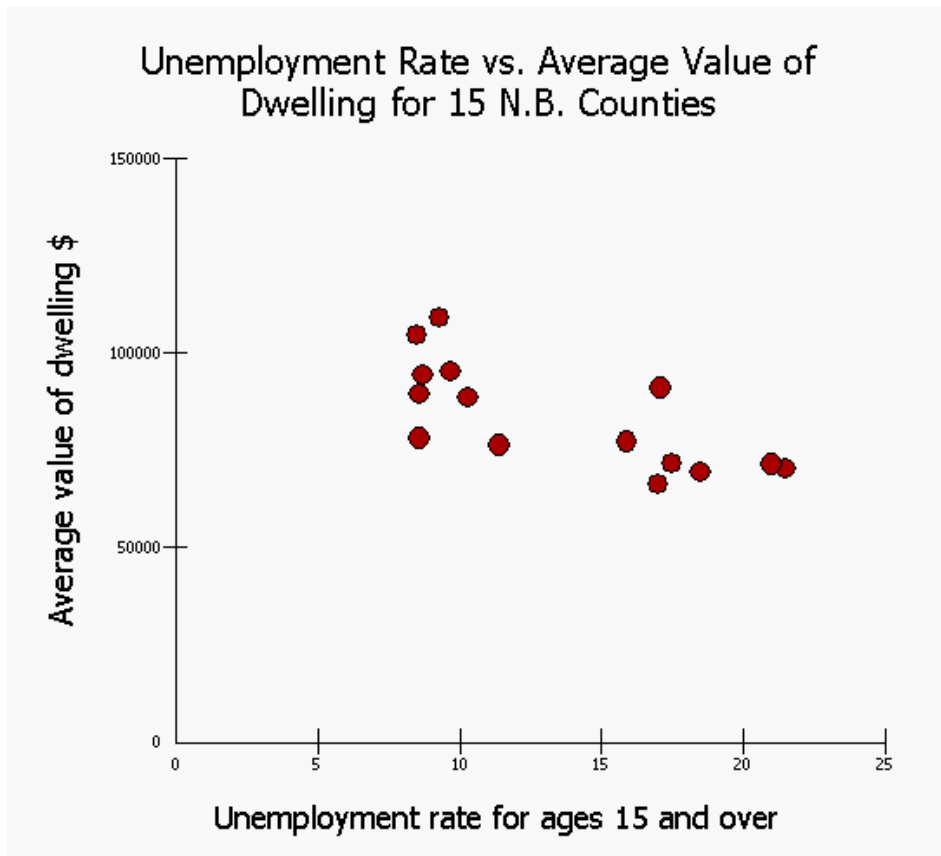
Area Name:	Unemployment rate, population 15 years and over	Average value of dwelling \$
New Brunswick - Albert County	8.7	94,302
New Brunswick - Carleton County	8.6	78,055
New Brunswick - Charlotte County	17.1	90,960
New Brunswick - Gloucester County	17	66,273
New Brunswick - Kent County	21.5	70,148
New Brunswick - Kings County	8.5	104,657
New Brunswick - Madawaska County	11.4	76,323
New Brunswick - Northumberland County	21	71,410
New Brunswick - Queens County	17.5	71,648
New Brunswick - Restigouche County	18.5	69,274
New Brunswick - Saint John County	10.3	88,661
New Brunswick - Sunbury County	8.6	89,337
New Brunswick - Victoria County	15.9	77,113
New Brunswick - Westmorland County	9.7	95,176
New Brunswick - York County	9.3	109,004

Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006

Census Table: Unemployment Rate versus Average Value of Dwelling for Counties in N.B., 2001

Lesson 3:

Graph 1: Unemployment Rate vs. Average Value of Dwelling



Source: Statistics Canada, <http://www.statcan.ca>, extracted June 27, 2006

E-STAT database for schools

Census: 2001 Census

Census Database: Provinces, Census Divisions, Municipalities

Profile: 2001 Census of Population, ALL TABLES

Geography: New Brunswick (15 Counties)

Characteristics:

- Unemployment rate, population 15 years and over
- Average value of dwelling \$

Lesson 3:

Table 1a: Unemployment Rate vs. Average Value of Dwelling

Additional Information – 1996 Census Table

Area Name:	Unemployment rate, population 15 years and over	Average value of dwelling \$
New Brunswick - Albert County	9.6	82,573
New Brunswick - Carleton County	10.4	71,094
New Brunswick - Charlotte County	23.5	71,951
New Brunswick - Gloucester County	21.7	60,364
New Brunswick - Kent County	24.0	62,463
New Brunswick - Kings County	10.3	91,003
New Brunswick - Madawaska County	15.0	66,886
New Brunswick - Northumberland County	24.6	68,358
New Brunswick - Queens County	20.5	62,545
New Brunswick - Restigouche County	23.0	65,526
New Brunswick - Saint John County	15.0	81,362
New Brunswick - Sunbury County	11.2	78,023
New Brunswick - Victoria County	17.2	72,397
New Brunswick - Westmorland County	11.1	87,114
New Brunswick - York County	10.9	100,355

Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006

Census Table: Unemployment Rate versus Average Value of Dwelling for Counties in N.B., 1996

E-STAT database for schools

Census: 1996 Census

Profile: 1996 Census of Population, ALL TABLES

Geography: New Brunswick (15 Counties)

Characteristics:

- Unemployment rate, population 15 years and over
- Average value of dwelling \$

Lesson 3:

Table 2: Female Enrolments in Engineering and Applied Sciences

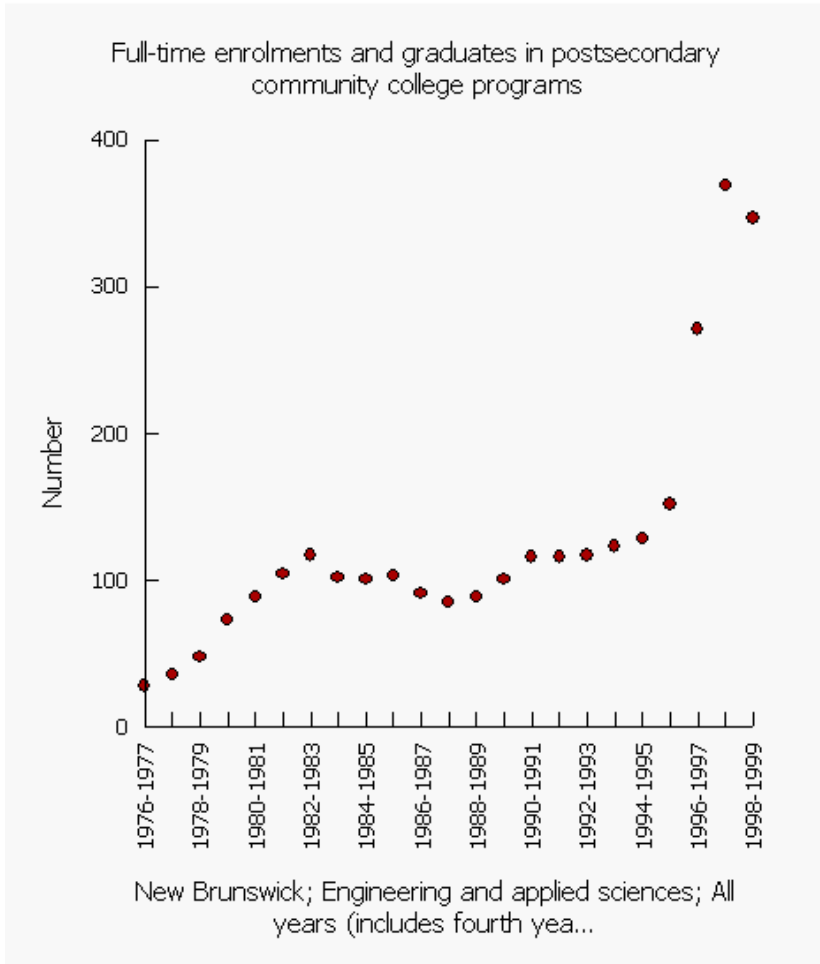
School Year	Female enrolments in engineering and applied sciences in NB
1976-77	28
1977-78	36
1978-79	48
1979-80	73
1980-81	89
1981-82	104
1982-83	117
1983-84	102
1984-85	101
1985-86	103
1986-87	91
1987-88	85
1988-89	89
1989-90	101
1990-91	116
1991-92	116
1992-93	117
1993-94	123
1994-95	128
1995-96	152
1996-97	271
1997-98	369
1998-99	347

Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006
CANSIM, Table 477-0006 on E-STAT

Table 477-0006 - Full-time enrolments and graduates in postsecondary community college programs, by program field, year in program and sex, annual

Lesson 3:

Graph 2: Female enrolments in engineering and applied sciences



Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25, 2006
CANSIM, Table 447-0006 on E-STAT

Survey or program details:

Full-Time and Part-Time Enrolments and Graduates of Postsecondary Programs of Community Colleges

Geography: New Brunswick

Program field: Engineering and applied sciences

Year in program: All years (includes fourth year students)

Sex: Females

Lesson 3:

Table 3: Births in Canada, 1946 to 2002

Computed annual total	Births
1946	331,471
1947	359,943
1948	348,226
1949	367,092
1950	372,009
1951	381,092
1952	403,559
1953	417,884
1954	436,198
1955	442,937
1956	450,739
1957	469,093
1958	470,118
1959	479,275
1960	478,551
1961	475,700
1962	469,693
1963	465,767
1964	452,915
1965	418,595
1966	387,710
1967	370,894
1968	364,310
1969	369,647
1970	371,988
1971	362,187
1972	347,319
1973	343,373

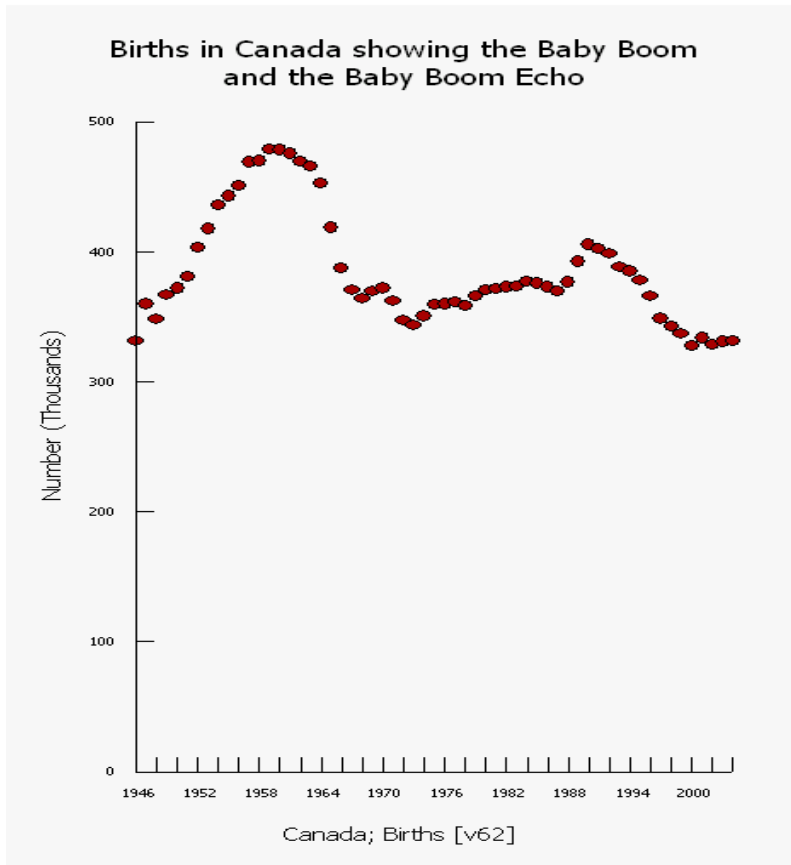
Computed annual total	Births
1974	345,645
1975	359,323
1976	359,987
1977	362,208
1978	358,410
1979	366,064
1980	370,709
1981	371,346
1982	373,082
1983	373,689
1984	377,031
1985	375,727
1986	372,912
1987	369,742
1988	376,795
1989	392,661
1990	405,486
1991	402,528
1992	398,643
1993	388,394
1994	385,114
1995	378,016
1996	366,200
1997	348,598
1998	342,418
1999	337,249
2000	327,882
2001	328,417
2002	327,514

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
 CANSIM, table 053-0001 on E-STAT

Table 053-0001: Vital statistics, births, deaths and marriages; Canada; Birth

Lesson 3:

Graph 3: Births in Canada, 1946 to 2004



Source: Statistics Canada, <http://www.statcan.ca>, extracted February 26, 2006
CANSIM, table 053-0001 on E-STAT

Survey or program details:

Table 053-0001 - Vital statistics, births, deaths and marriages, quarterly

Geography: Canada

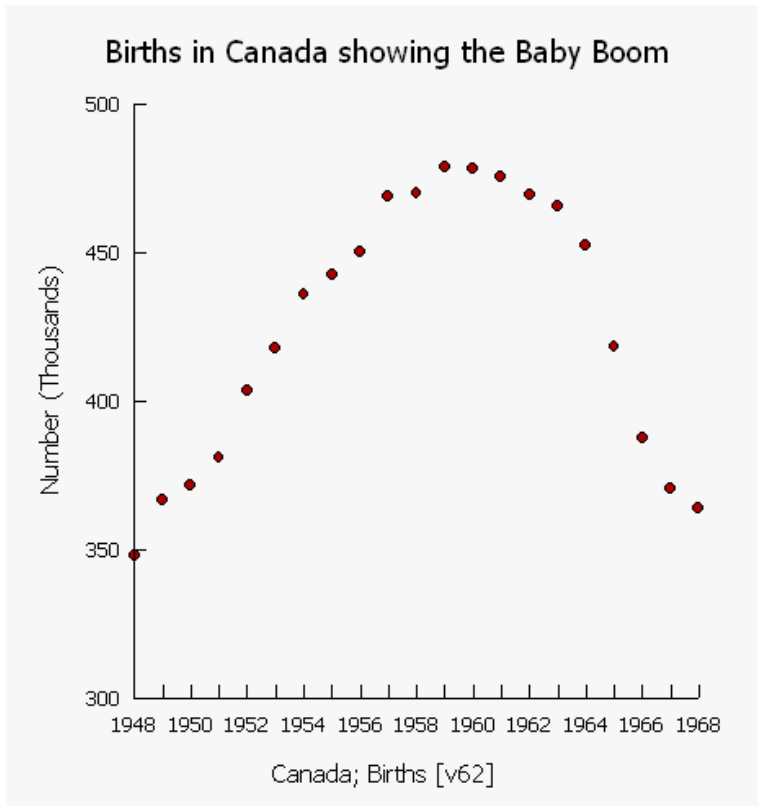
Estimates: Births

Frequency: converted to annual (sum)

Dates: Mar. 1946 to Mar. 2005

Lesson 3:

Graph 4: Births in Canada, 1948 to 1968



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Table 053-0001 on E-STAT

Survey or program details:

Table 053-0001 - Vital statistics, births, deaths and marriages, quarterly

Geography: Canada

Estimates: Births

Frequency: converted to annual (sum)

Dates: Mar. 1946 to Dec. 1968

Lesson 3: Instructions for completing graphs:

Table 1 and Graph 1: Unemployment Rate vs. Average Value of Dwelling

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search Census** from the list on the left of the screen.
4. Choose **2001 Census** and click **Go!**
5. Select **2001 Census of Population (Provinces, Census Divisions, Municipalities)** and click **Go!**
6. **Profile** selection: Click the arrow to see all the choices, and select **2001 Census of Population: All Tables**, and then click **Go!**
7. At the next screen, make the following choices:
Geography: Choose **2001 – N.B. (15 counties)**
Characteristics: Click on the **View Checklist** button. At the next screen, scroll down to put checkmarks in the boxes for these characteristics:
Unemployment rate, population 15 years and over (halfway down the list)
Average value of dwelling (near the bottom of the list)
8. Go to the bottom of the list and click the button: **Back to Main Selection Form.**
9. At the bottom of the main selection form, choose the output format. The choices used for this graph were **Table: Area as Rows**, and **Scatter Graph.**
10. Table 1a was generated in the same way, using the information from the **1996 Census** data.

Table 2 and Graph 2: Female enrolments in engineering and applied sciences

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number (**477-0006**) and click **Continue**.
6. At the next screen, select the following information:
Geography: choose **New Brunswick**
Program field: choose **Engineering and applied sciences**
Year in program: choose **All years (includes fourth year students)**
Sexes: choose **Females**
7. The data choices show the latest year of data available. Change the first date to 1976 (the earliest year with data). The dates should appear: **From 1976 to 1998 (Annual data)**
8. Choose **Retrieve as individual Time Series**.
9. At the next screen, go to the **Output format selection** and choose your format. The choices used for this graph were **HTML Table: Time as Rows**, and **Scatter graph**.
10. Leave all other options as they are.
11. Click **Go** to view your data in the format requested.

Table 3 and Graph 3: Births in Canada since 1946

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number (**053-0001**) and click **Continue**.
6. At the next screen, select the following information:
Geography: choose **Canada**
Estimates: choose **Births**
7. The data choices show the latest year of data available. Change the first date to 1946 (the earliest year with data). The dates should appear: **From Mar 1946 to current date (Quarterly data)**
8. Choose **Retrieve as individual Time Series**.
9. At the next screen, go to the **Output format selection** and choose either to view the data as a table (choose **HTML Table, time as rows** format), or as a scatter plot (choose **Scatter graph**)
10. Change the **frequency of the output data to converted to annual (sum)**.
11. Leave all other options as they are.
12. **Output format selection:** choose your format. The choices used for this graph were **HTML Table: Time as Rows**, and **Scatter graph**.
13. Click **Go** to view your data in the format requested.
14. Click **Modify Graphic** under the graph. Now go in and change the title to better describe the content of the graph. We also suggest that you click the Origin checkbox labeled 'Start axis at 0' so that the y-axis begins at 0.
15. If you wish to check different time sequences, follow all steps above, but choose the date range applicable to the study you are conducting.

Teacher Notes

Lesson 4: Best ways to display data

Purpose:

In this lesson, determining which display is the most appropriate for any particular set of data will be examined. Students have had exposure to many types of graphs and in this lesson they will make decisions as to which one is the best representation of the data.

Outcome:

F4 select, defend, and use the most appropriate methods for displaying data

Materials:

- Summary of Graph Types chart
- Activity Sheets with data for graphing
- Appropriate grids

Lesson description:

Give students the **Summary of Graph Types** handout and the data tables provided.

Using the graph chart and prior knowledge, students should consider the data provided and draw the graph that is the most appropriate type of display for each data table. They should be prepared to explain and defend their choice of graph displays.

Students might be asked to do these activities either individually or in pairs.

Communications:

Students should be able to discuss the types of data provided and explain their reasons for the choice of graph they used.

Technology:

Software such as spreadsheets or Fathom could be used to show the various types of graph that could be used for different data sets. Graphs can be changed from one type to another very easily. This could help students see why certain types of data are more appropriate for graph choices such as scatter plots or stem and leaf graphs.

Additional Information:

Teachers should be aware that Fathom will only provide those graph choices that are appropriate for the data provided. For example, if the data given is continuous numerical information, the graph choices might be limited to scatter plots and line graphs. Other options would not be available. Most spreadsheets will allow the user to attempt to create any type of graph with any selected data, even if it is not possible to display the data in that form. If a teacher wishes to

demonstrate that some graph types are less appropriate than others for specific data using technology, a spreadsheet might be a better choice than Fathom, since the graphs can be attempted.

Lesson 4: Summary of Graph Types

Graph type	Description
stem and leaf	A stem and leaf plot, or stem plot, is a technique used to classify either <i>discrete</i> or <i>continuous</i> variables. A stem and leaf plot is used to organize data as they are collected.
vertical bar graph	Compares important data values. Displays data better than horizontal bar graphs, and is preferred when possible.
dot graph	Displays a comparatively large number of categories when category order is unimportant. Best used when portraying category values in descending order.
histogram	Shows <i>discrete</i> or <i>continuous</i> variable data in a similar way to column graphs, but without the gap between the columns.
histogram (frequency polygon)	Depicts <i>continuous</i> variable data. Smooths abrupt changes which may appear in a histogram
horizontal bar graph	Compares important data. Useful when category names are too long to fit at the foot of a column.
line graph	Depicts data over time.
pictograph	Favored by professional graphic artists, although students can create simple pictorial presentations as well. Comparisons must be accurately depicted and respect the scale.
pie chart	Compares a small number of categories. Values should be markedly different, or differences may not be easy to decipher. Labeling pie segments with their actual values overcomes this problem. When data points are similar, the pie chart's message may be misunderstood. A bar graph may be better in this case.
scatter plot	Measures two or more variables thought to be related.
box and whisker	A box-and-whisker plot displays the dispersion (spread/distribution) of data by organizing data into four quarters. Five values are required to construct a box-and-whisker plot: the median of all the data, the median of the upper half of the data (called upper quartile), the median of the lower half of the data (called lower quartile), the upper extreme (highest value), and the lower extreme (lowest value).

Lesson 4: Datasets

Dataset 1: French mother tongue population in Canada by province

Area Name:	French, single responses, total population by mother tongue
Newfoundland and Labrador	2,180
Prince Edward Island	5,665
Nova Scotia	34,025
New Brunswick	236,665
Quebec	5,761,765
Ontario	485,630
Manitoba	44,335
Saskatchewan	17,780
Alberta	58,645
British Columbia	54,400
Yukon Territory	890
Northwest Territories	950
Nunavut	395

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Census Table: French, single responses, total population by mother tongue, Canada by province

E-STAT database for schools

Census: 2001 Census of Population (Provinces, Census Divisions, Municipalities)

Profile: 2001 Languages, Mobility and Migration

Geography: 2001 Provinces and Territories in Canada

Characteristic:

- French, single responses, total population by mother tongue

Lesson 4: Datasets – Teacher Notes

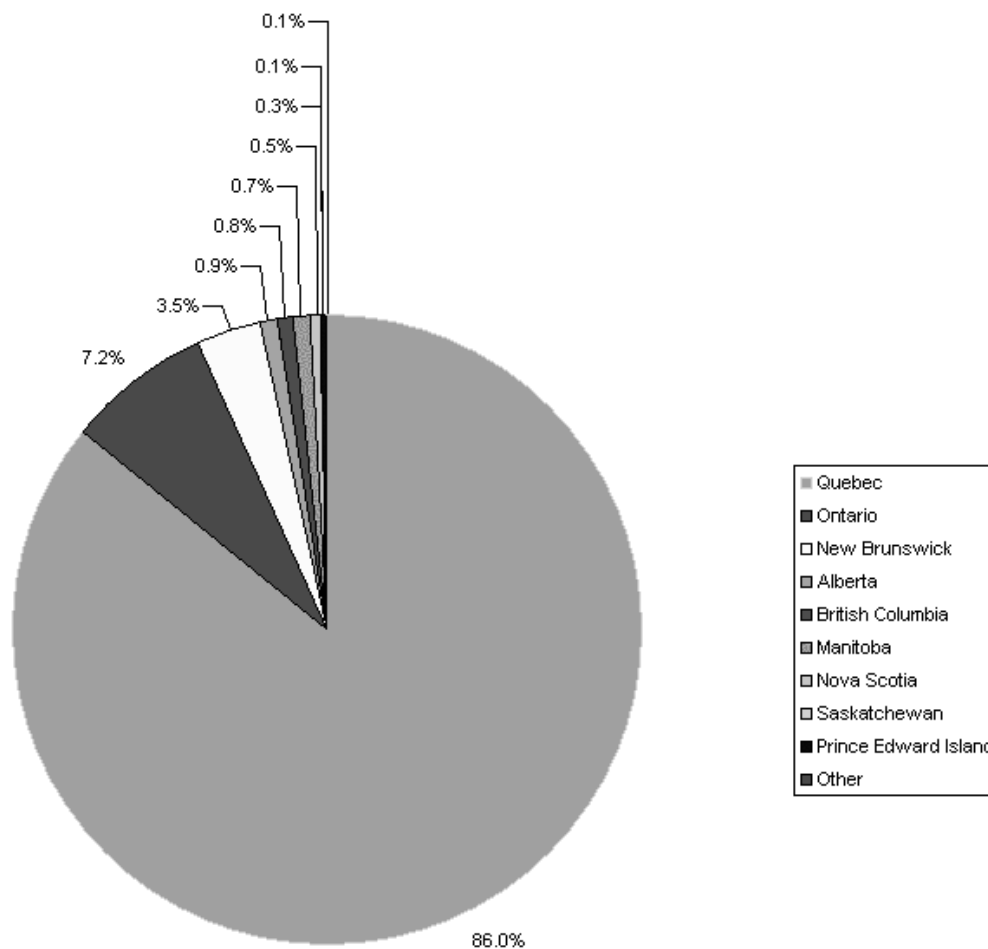
Dataset 1:

Recommended graph type:

Pie chart as it is the best way of showing the proportion of Francophones across Canada by province

Example from Excel:

2001 – French, total population by mother tongue



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Lesson 4: Datasets

Dataset 2: Area of Forest planted and cut by province in Canada

Area Name:	Total area of trees harvested, 1997, sq km	Tree replenishment by planting with seedlings, 1997, sq km
Alberta	507	453
British Columbia	1,758	1,885
Manitoba	155	62
New Brunswick	1,124	200
Newfoundland	200	34
Northwest Territories	4	2
Nova Scotia	695	81
Ontario	1,979	728
Prince Edward Island		0
Quebec	3,627	728
Saskatchewan	175	157
Yukon Territory		0

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Census Table: Environment, Area of trees harvested, area of trees planted as seedlings, 1997, Canada by province

E-STAT: Choose **Data** in the Table of Contents
Choose **Land and Resources** – Environment
Choose **Environment Module** – Environment
Choose **Environment Statistics** – Provinces

Geography: Canada by Province

Characteristics:

- Total area of trees harvested, 1997, sq km
- Tree replenishment by planting with seedlings, 1997, sq km

Lesson 4: Datasets – Teacher Notes

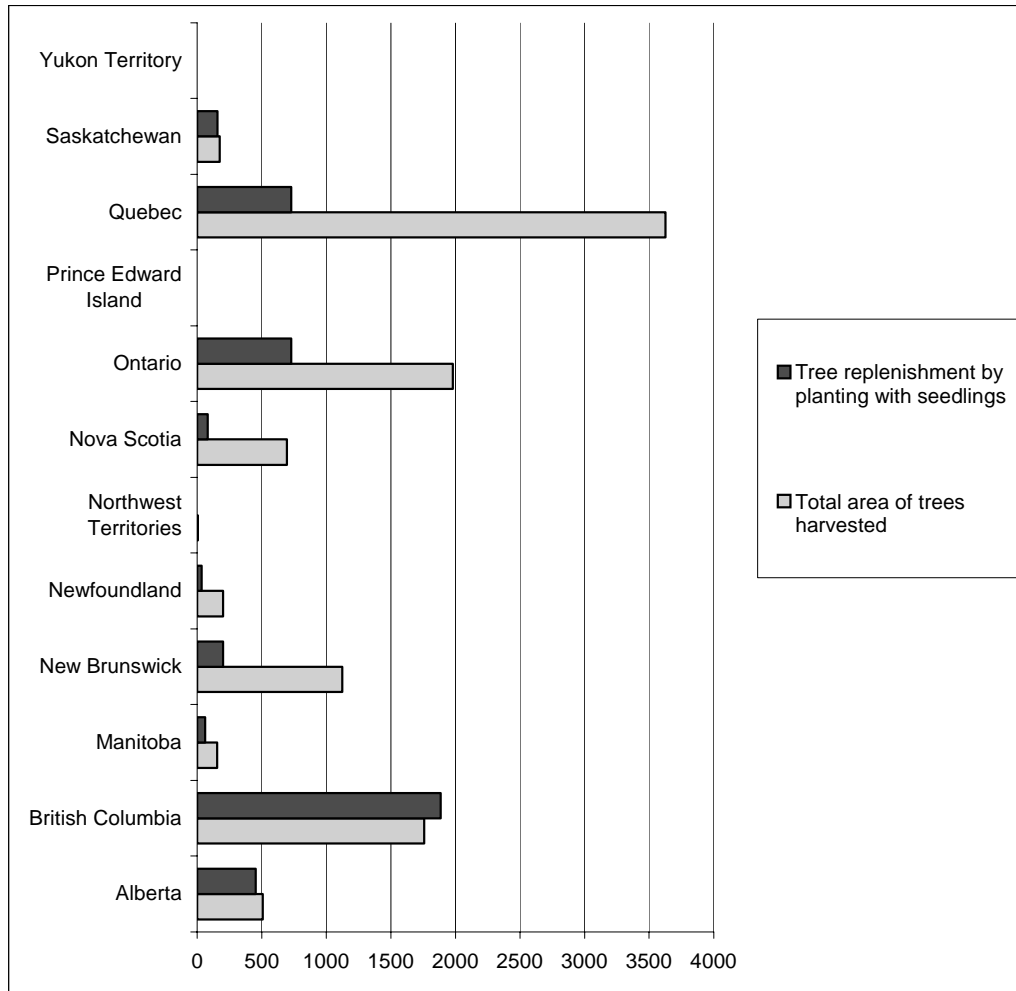
Dataset 2:

Recommended graph type:

Bar graph as it enables us to show two variables and compare the two values for each province. It also lets us compare the total harvesting among provinces.

Example from Excel:

Area of Forest planted and cut by province in Canada



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004

Lesson 4: Datasets

Dataset 3: The percentage of Canadians who are overweight by age and by gender

Age group	Sex	1998-1999
20-24 years	Men	18.3
	Women	10.0 ^{E 1}
25-34 years	Men	33.0
	Women	22.3
35-44 years	Men	38.0
	Women	23.5
45-54 years	Men	43.4
	Women	32.2
55-64 years	Men	42.6
	Women	36.0

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Table 104-0008 on E-STAT

Symbol legend:
E – Use with caution

Table 104-0008 - Body mass index (BMI), Canadian standard, by age group and sex, household population aged 20 to 64 excluding pregnant women, Canada and provinces, every 2 years

Survey or program details:

National Population Health Survey - Household Component, Cross-Sectional - 3236

Geography: Canada

Body mass index (BMI), Canadian standard: Overweight - BMI higher than 27.0

Characteristics: Percent

Footnote:

Data with a coefficient of variation (CV) from 16.6% to 33.3% are identified by an (E) and should be interpreted with caution.

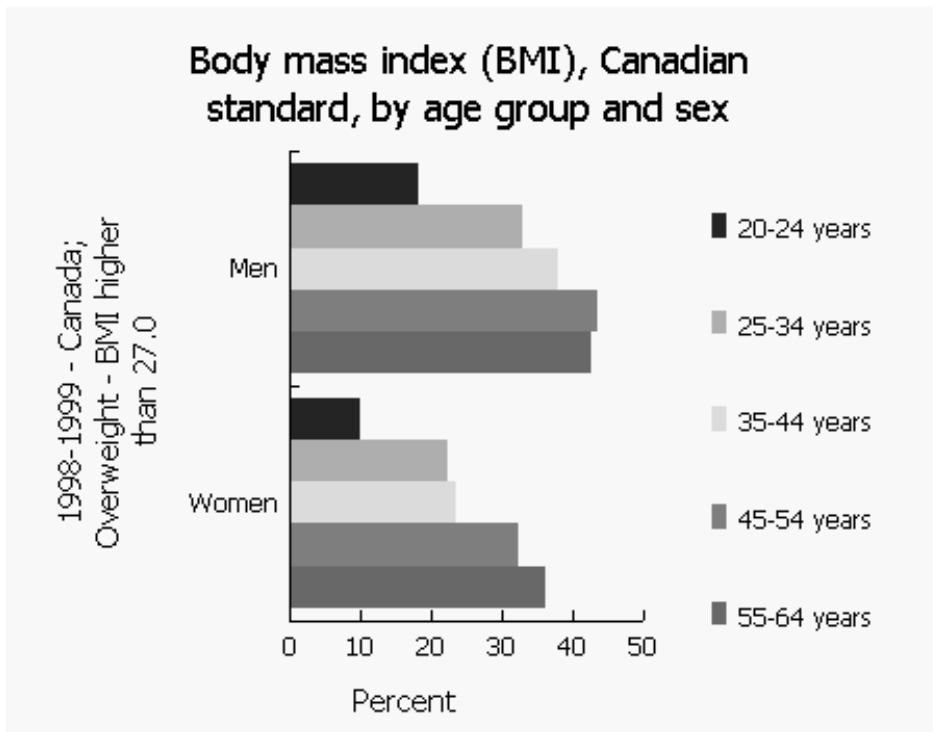
Lesson 4: Datasets – Teacher Notes

Dataset 3:

Recommended graph type:

Bar graph as it clearly shows variation in the rate of being overweight by age and by gender. It also lets us compare the rates among specific age group for males and females.

Example from E-STAT:



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Table 104-0008 on E-STAT

Lesson 4: Datasets

Dataset 4: Population of Counties in New Brunswick from the 2001 Census

Area Name:	Population, 2001
New Brunswick – Albert County	26,749
New Brunswick – Carleton County	27,184
New Brunswick – Charlotte County	27,366
New Brunswick–Gloucester County	82,929
New Brunswick – Kent County	31,383
New Brunswick – Kings County	64,208
New Brunswick – Madawaska County	35,611
New Brunswick – Northumberland County	50,817
New Brunswick – Queens County	11,862
New Brunswick – Restigouche County	36,134
New Brunswick – Saint John County	76,407
New Brunswick – Sunbury County	25,776
New Brunswick – Victoria County	21,172
New Brunswick – Westmorland County	124,688
New Brunswick – York County	87,212

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 16, 2006

Census Table: 2001, Population of Counties in New Brunswick

E-STAT database for schools

Census: 2001 Census of Population (Provinces, Census Divisions, Municipalities)

Profile: 2001 Population and Dwelling counts

Geography: N.B. (15 Counties)

Characteristic:

- Population, 2001

Lesson 4: Datasets – Teacher Notes

Dataset 4:

Recommended graph type:

Stem and leaf graph to count and graphically show the number of counties in each range of population: 1-9,999 then 10,000 – 19,999, etc.

No example available

Teacher Notes

Lesson 5 Student Activities

Purpose:

Students will work through a series of activities that will have them closely examining a set of data in order to make decisions, draw inferences and form conclusions, as well as reinforce concepts learned in Lessons 1 – 4.

Outcomes:

- F1 describe characteristics of possible relationships shown in scatter plots
- F2 sketch lines of best fit and determine their equations
- F3 sketch curves of best fit for relationships that appear to be non-linear
- F4 select, defend, and use the most appropriate methods for displaying data
- F5 draw inferences and make predictions based on data analysis and data displays
- F6 demonstrate an understanding of the role of data management in society
- F7 evaluate arguments and interpretations that are based on data analysis

Materials:

- access to the Internet and word processor, and graphing technology (optional)
- **Create a Data Set** (at the end of Project 6) **OR** one of the six **Activity Projects** provided at the end of the lesson (Activity Projects include a statement for analysis, data table(s), graph(s), instructions to find the data on E-STAT, and, where available, the URL for a *Daily* article related to the project topic).
- access to newspapers and/or magazines
- Question Sheet - **Series I** and **Series II**.

Lesson description:

Students will take a prepared set of data from E-STAT (Statistics Canada) OR create their own set of data from the E-STAT (Statistics Canada) site and work through a series of activities that address the Grade 9, GCO F outcomes.

Communications:

Students will read a minimum of two articles related to their data, answer questions about their interpretation of the data and of what they read, formulate a critical response to a given statement, and create a 5-minute presentation communicating their response to their classmate using the information they have examined.

Technology:

As students access information and analyze data utilizing E-STAT and various types of technology, they will be addressing the outcomes for the integration of information technologies, in addition to the mathematics outcomes. See the chart on pages 67 and 68.

Additional Information:

Series III questions will be specific to the student's chosen topic and may need to be created by the teacher, whereas **Series I and II** questions are the same for all students.

Lesson 5: Student Activities

Activity 1:

1. Select a dataset from the sets provided by your teacher or extract a dataset from E-STAT with a strong correlation by following instructions given in **Create a Dataset**, at the end of the project ideas.
2. Read an associated *Daily* article from the StatsCan website at <http://www.statcan.ca>
3. Find a newspaper or magazine article about your chosen issue that contains some statistical data.
4. Answer the **Series I** questions.

Activity 2:

1. Answer the general **Series II** questions for your data.

Activity 3:

1. Answer specific **Series III** questions about your data.
2. Prepare a 5-minute presentation on how you would support the given statement using your data. Explain the other factors that may be used to dispute your argument.

Lesson 5: Student Activities

Questions:

Series I:

1. Examine your data, what are some initial statements that can be made about the information?
2. Is there anything surprising or unusual about your data?
3. What was the related *Daily* article about?
4. Summarize the main points from the article you found.
5. What are the similarities and differences between the Daily article and the newspaper/magazine article?
6. Can you draw any additional statements about your data after reading the articles?
7. After examining the data and reading the articles, list at least three related questions that you or someone else could investigate.

Series II:

1. Examine the two variables in your dataset. Do you feel that one variable would have an effect on the other? Explain your answer using the terms independent variable and dependent variable.
2. Create a scatter plot for your data. Describe the correlation of the relationship between your variables.
3. Use the scatter plot you have created to consider the following:
 - a) On a hard copy of your scatter plot, draw the line of best fit. Is the line solid or dotted? Explain.
 - b) Write a brief explanation describing the confidence you have in the placement of the line of best fit.
4. Find the equation of the line that represents your data. Then respond to the following statements:
 - a) Explain the significance of the slope for your data.
 - b) Explain the significance of the y-intercept for your data.
5. Choose two different graphical displays and describe a situation where it would be appropriate to use each with your data.

Lesson 5 Project 1: Population Growth Project

Statement for analysis: Canada's population is increasing linearly

Related articles from the Statistics Canada website:

- Daily article: <http://www.statcan.ca/Daily/English/030925/d030925e.htm>
- Daily article: <http://www.statcan.ca/Daily/English/010313/d010313a.htm>

Series III questions:

Describe the trends that can be seen in this dataset.

Based on the pattern shown in the graph, when do you predict Canada's population will reach 40 million? Would your prediction change if you were to use only the data from 1990 to 2002?

Would you expect the trend in birth rates in Canada to be similar to this? Explain your answer.

Instructions for accessing data:

Follow the instructions below to access this data for yourself. Instructions are given for students accessing the data from a school computer.

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number (**051-0005**) and click **Continue**.
6. For **Geography**, choose **Canada**.
7. The data choices show the latest year of data available. Change the first date to 1946 (the earliest year with data). The dates should appear **From Jan 1946 to Dec 2002 (Quarterly data)**
8. Choose **Retrieve as individual Time Series**.
9. At the next screen, go to the **Output format selection** and choose either to view the data as a table (choose **HTML Table, time as rows** format) or as a scatter plot (choose **Scatter graph**)
10. Change the **frequency of the output data** to **converted to annual (average)**.
11. Leave all other options as they are.
12. Click **Go** to view your data in the format requested.
13. If you wish to check different time sequences, follow all steps above, but choose the date range applicable to the study you are conducting.

Population Growth Project

Table: Estimates of population, Canada, provinces and territories

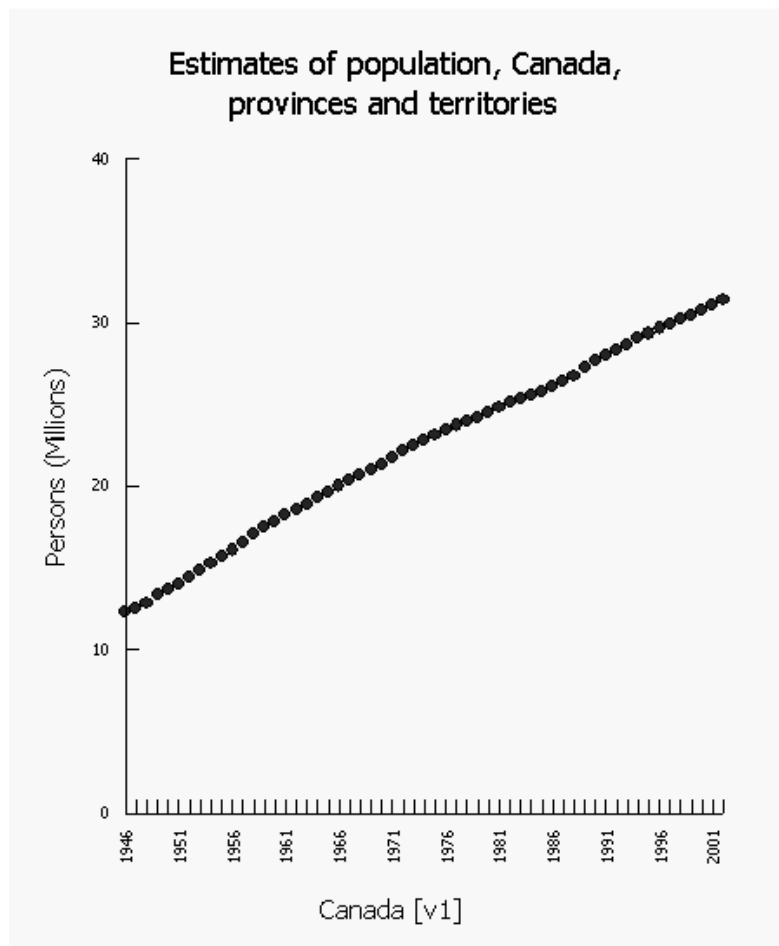
Computed annual average	Estimates of population, Canada, provinces and territories; (Persons)	Computed annual average	Estimates of population, Canada, provinces and territories; (Persons)
1946	12,284,500	1975	23,101,938
1947	12,544,750	1976	23,414,220
1948	12,816,250	1977	23,694,351
1949	13,355,000	1978	23,936,305
1950	13,703,500	1979	24,170,847
1951	14,005,000	1980	24,471,392
1952	14,436,750	1981	24,785,074
1953	14,833,000	1982	25,083,464
1954	15,269,500	1983	25,336,486
1955	15,681,250	1984	25,577,263
1956	16,070,250	1985	25,813,686
1957	16,579,500	1986	26,068,572
1958	17,062,250	1987	26,402,270
1959	17,467,500	1988	26,758,946
1960	17,855,250	1989	27,224,791
1961	18,224,500	1990	27,642,857
1962	18,570,750	1991	27,989,712
1963	18,919,000	1992	28,329,685
1964	19,277,250	1993	28,670,208
1965	19,633,500	1994	28,995,383
1966	19,997,500	1995	29,315,266
1967	20,363,750	1996	29,632,616
1968	20,692,000	1997	29,943,799
1969	20,994,250	1998	30,213,772
1970	21,287,500	1999	30,467,978
1971	21,747,418	2000	30,750,660
1972	22,188,099	2001	31,061,376
1973	22,455,735	2002	31,363,847

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
 CANSIM Table 051-0005 on E-STAT

Table 051-0005 - Estimates of population, Canada, provinces and territories, converted to annual average (Persons)

Teacher Notes: Population Growth Project

Sample Graph: Estimates of population, Canada, provinces and territories



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM Table 051-0005 on E-STAT

Survey or program details:

Table 051-0005: Estimates of population, Canada, provinces and territories, converted to annual average (Persons)

Geography: Canada

Time: Jan 1946 to Dec 2002

Output: converted to annual (Average)

Lesson 5 Project 2: Agriculture Project

Statement for analysis: People in New Brunswick consumed more potatoes in 1908 than they do now.

Related articles from the Statistics Canada website:

- Daily article: <http://www.statcan.ca/Daily/English/030117/d030117d.htm>
- Canadian potato production - Updates
<http://www.statcan.ca/english/freepub/22-008-UIB/22-008-UIB02003.pdf>

Series III questions:

Describe the trends that can be seen in this dataset.

Examine the change in the number of acres seeded from 1913 to 1916. What do you think might have affected these results?

What would you expect the number of acres seeded to be in 2007? Explain.

Instructions for accessing data:

Data for the New Brunswick potato crop are given in table and graph form below. Follow the instructions below to access data for New Brunswick or Prince Edward Island. Instructions are given for students accessing the data from a school computer.

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number **(001-0014)** and click **Continue**.
6. At the next screen, select New Brunswick for Geography and Seeded area (Acres) in the Estimates list.
7. The data choices show the latest year of data available. Change the first date to 1908 (the earliest year with data). The dates should appear **From 1908 to 2002 (Annual data)**
8. Choose **Retrieve as individual Time Series**.
9. At the next screen, go to the **Output format selection** and choose either to view the data as a table (choose **HTML Table, time as rows** format) or as a scatter plot (choose **Scatter graph**).
10. Leave all other options as they are.
11. Click **Go** to view your data in the format requested.

Agriculture Project

Table: Acres seeded with potatoes, NB

Year	Acres seeded with potatoes
1908	56,600
1909	58,600
1910	40,400
1911	41,000
1912	43,000
1913	43,500
1914	43,900
1915	40,000
1916	39,000
1917	46,000
1918	57,300
1919	75,600
1920	78,300
1921	74,900
1922	74,800
1923	45,500
1924	46,200
1925	40,000
1926	42,700
1927	47,000
1928	52,200
1929	45,200
1930	48,000
1931	60,300
1932	48,200
1933	46,900
1934	54,200
1935	44,300
1936	45,100
1937	50,200
1938	50,900
1939	50,900

Year	Acres seeded with potatoes
1940	54,300
1941	44,100
1942	47,200
1943	56,400
1944	62,600
1945	63,100
1946	64,800
1947	61,700
1948	60,400
1949	55,100
1950	52,900
1951	38,100
1952	42,700
1953	48,400
1954	45,600
1955	47,000
1956	46,200
1957	46,300
1958	46,000
1959	44,600
1960	50,000
1961	54,200
1962	50,000
1963	53,000
1964	54,000
1965	57,000
1966	64,900
1967	62,000
1968	61,000
1969	64,000
1970	61,000
1971	59,400

Year	Acres seeded with potatoes
1972	51,000
1973	51,000
1974	56,000
1975	52,000
1976	55,500
1977	57,000
1978	58,000
1979	56,000
1980	52,000
1981	54,000
1982	54,000
1983	53,000
1984	54,000
1985	55,500
1986	48,466
1987	50,500
1988	47,000
1989	50,000
1990	52,000
1991	50,600
1992	53,000
1993	51,000
1994	53,000
1995	55,000
1996	54,100
1997	56,000
1998	57,000
1999	56,000
2000	55,000
2001	58,400
2002	58,000

Source: Statistics Canada, <http://www.statcan.ca>, extracted February 25,

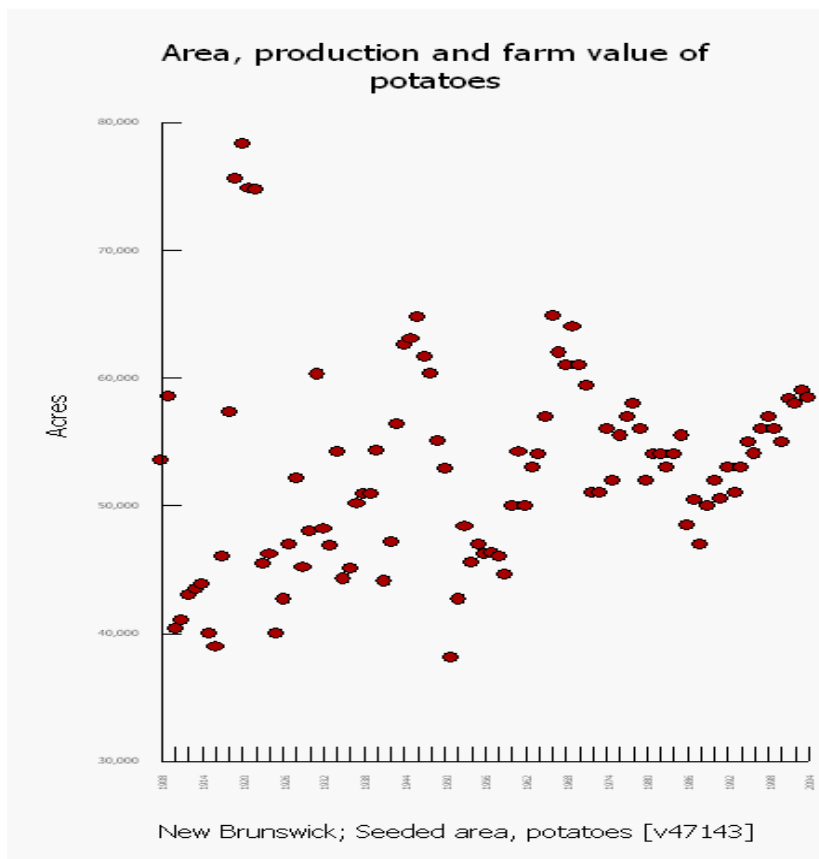
2006,

CANSIM, Table 001-0014 on E-STAT

**Table 001-0014 - Area, production and farm value of potatoes, annual
Acres seeded with potatoes, NB**

Teacher Notes: Population Growth Project

Sample Graph: Acres seeded with potatoes, N.B.



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Table 001-0014 on E-STAT

Survey or program details:

Table 001-0014: Area, production and farm value of potatoes, annual

Geography: New Brunswick

Estimates: Seeded area (acres)

Time: 1908 to 2002

Lesson 5 Project 3: Electrician Wage Project

Statement for analysis: Saint John electricians need a raise

Related articles from the Statistics Canada website:

- Daily article: <http://www.statcan.ca/Daily/English/021021/d021021h.htm>

Series III questions:

Describe the trends that can be seen in this dataset.

What difference did you see with the change in electrician's wages from 1993 to 2002, and the wage changes from 1971 to 1980? Explain your findings.

What would you expect electrician's wages to be in 2007? Explain.

Instructions for accessing data:

Follow the instructions below to access this data for yourself. Instructions are given for students accessing the data from a school computer.

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number (**327-0003**) and click **Continue**.
6. At the next screen, select the following information:
Geography: choose Saint John, New Brunswick
Construction Trades: choose Electrician
Type of wage rates: choose Basic construction union wage rates. Dollars per hour
7. The data choices show the latest year of data available. Change the first date to 1971 (the earliest year with data). The dates should appear **From Jan 1971 to Dec 2002 (Monthly data)**
8. Choose Retrieve as individual Time Series.
9. At the next screen, go to the **Output format selection** and choose either to view the data as a table (choose **HTML Table, time as rows** format) or as a scatter plot (choose **Scatter graph**)
10. Change the **frequency of the output data to converted to annual (average)**.
11. Leave all other options as they are.
12. Click **Go** to view your data in the format requested.

Electrician Wage Project

Table: Construction union wage rates, electricians, N.B.

Year	Computed annual average
1971	4.82
1972	5.53
1973	6.15
1974	7.25
1975	7.75
1976	8.52
1977	9.38
1978	9.92
1979	10.51
1980	11.20
1981	12.44
1982	13.79
1983	16.10
1984	16.84
1985	17.18
1986	17.51
1987	17.51

Year	Computed annual average
1988	17.51
1989	17.51
1990	17.51
1991	17.51
1992	18.33
1993	22.97
1994	24.08
1995	24.08
1996	23.72
1997	23.95
1998	23.95
1999	23.95
2000	24.45
2001	25.50
2002	25.68

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 29, 2006
 CANSIM Table 327-0003 on E-STAT

Table 327-0003: Construction union wage rates, electricians, NB

Survey or program details:

v39490 - from Table 327-0003: Construction union wage rates

Geography: Saint John, New Brunswick

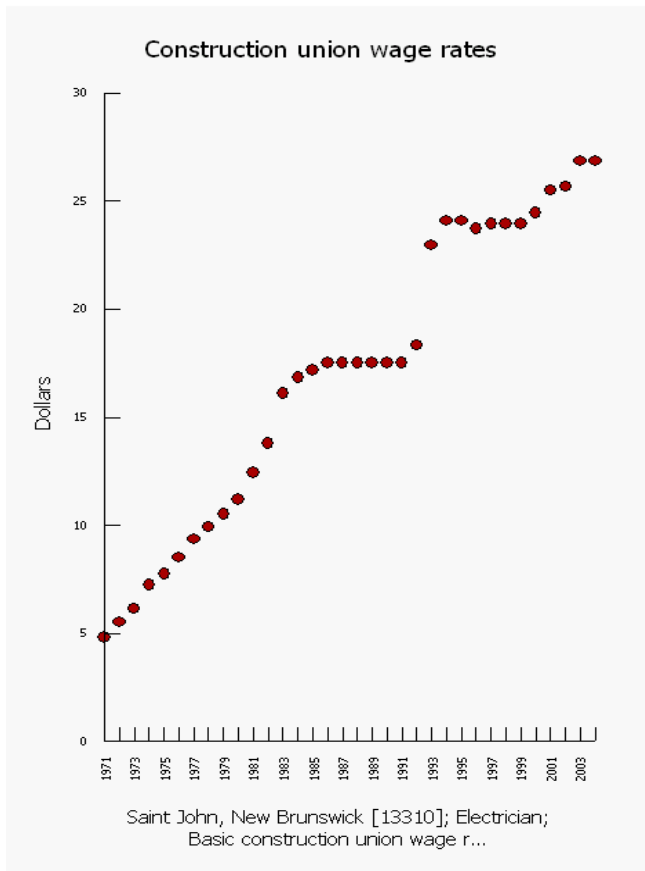
Construction trades: Electrician

Type of wage rates: Basic construction union wage rates. Dollars per hour

Output: converted to annual (Average)

Teacher Notes: Electrician Wage Project

Sample Graph: Construction union wage rates, electricians, N.B.



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 29, 2006
CANSIM Table 327-0003 on E-STAT

Lesson 5 Project 4: Consumer Price Index Project

Statement for analysis: Our ability to purchase goods has been affected by the consumer price index.

Related articles from the Statistics Canada website:

- Daily article: <http://www.statcan.ca/Daily/English/021021/d021021h.htm>

Series III questions:

Describe the trends that can be seen in this dataset.

In what years did we see the greatest increase in the consumer price index?

What would you expect the consumer price index to be in 2007? Explain.

Instructions for accessing data:

Follow the instructions below to access this data for yourself. Instructions are given for students accessing the data from a school computer.

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number (**326-0002**) and click **Continue**.
6. At the next screen, select the following information:
Geography: choose Saint John, New Brunswick
Commodities and commodity groups: All-items
7. The data choices show the latest year of data available. Change the first date to 1971 (the earliest year with data). The dates should appear **From 1971 to 2002 (Annual data)**
8. Choose **Retrieve as individual Time Series**.
9. At the next screen, go to the **Output format selection** and choose either to view the data as a table (choose **HTML Table, time as rows** format) or as a scatter plot (choose **Scatter graph**)
10. Change the **frequency of the output data to converted to annual (average)**.
11. Leave all other options as they are.
12. Click **Go** to view your data in the format requested.

Consumer Price Index Project

Table: Consumer price index, 2001 basket content; Saint John, All-items

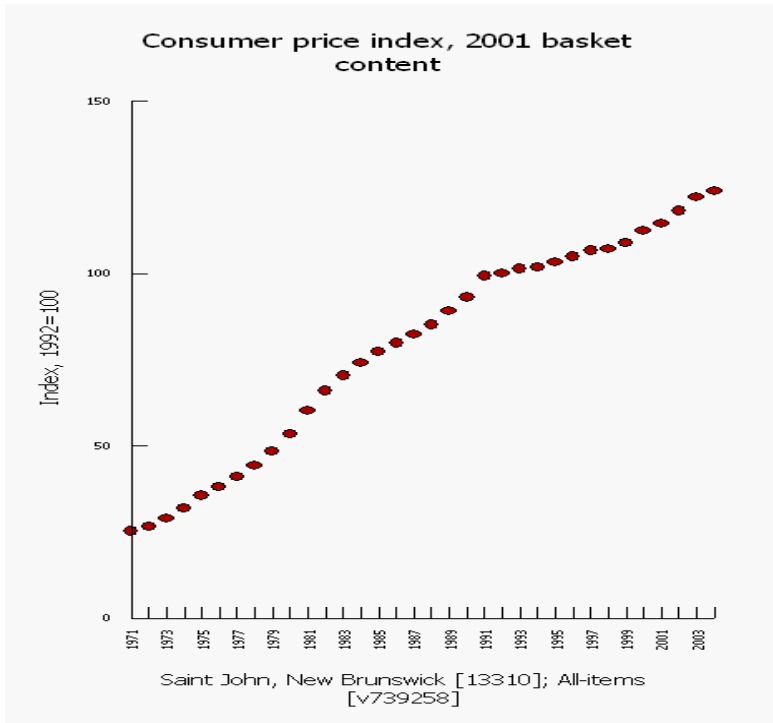
Computed annual average	Consumer price index, Saint John, NB, all items
1971	25.3
1972	26.7
1973	29.0
1974	32.0
1975	35.6
1976	38.2
1977	41.1
1978	44.3
1979	48.5
1980	53.5
1981	60.3
1982	66.0
1983	70.5
1984	74.1
1985	77.3
1986	79.9
1987	82.4
1988	85.2
1989	89.2
1990	93.2
1991	99.3
1992	100.0
1993	101.4
1994	101.8
1995	103.4
1996	104.9
1997	106.7
1998	107.2
1999	109.0
2000	112.5
2001	114.5
2002	118.2

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Tables 327-0002 on E-STAT

326-0002: Consumer price index, 2001 basket content; Saint John, All-items

Teacher Notes: Consumer Price Index Project

Sample Graph: Consumer price index, 2001 basket content; Saint John, All-items



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Tables 327-0003 and 326-0002 on E-STAT

Survey or program details:

v39490 - from Table 327-0003: Construction union wage rates

Geography: Saint John, New Brunswick

Construction trades: Electrician

Type of wage rates: Basic construction union wage rates. Dollars per hour

Output: converted to annual (Average)

v739252 – from Table 326-0002: Consumer price index, 2001

Geography: Saint John, New Brunswick

Commodities and commodity groups: All-items

Lesson 5 Project 5: Tuition Project

Statement for analysis: Students can no longer afford to go to university

Related articles from the Statistics Canada website:

- Daily article: <http://www.statcan.ca/Daily/English/020821/d020821b.htm>

Series III questions:

Describe the trends that can be seen in this dataset.

Describe the difference between the increase in tuition from 1979 to 1991 and the increase in tuition from 1992 to 2002.

What would you expect the consumer price index for tuition fees to be in 2007? Explain.

Instructions for accessing data:

Follow the instructions below to access this data for yourself. Instructions are given for students accessing the data from a school computer.

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number (**326-0002**) and click **Continue**.
6. At the next screen, select the following information:
Geography: choose New Brunswick
Commodities and commodity groups: choose Education: Tuition Fees
7. The data choices show the latest year of data available. Change the first date to 1979 (the earliest year with data). The dates should appear **From 1979 to 2002 (Annual data)**
8. Choose Retrieve as individual Time Series.
9. At the next screen, go to the **Output format selection** and choose either to view the data as a table (choose **HTML Table, time as rows** format) or as a scatter plot (choose **Scatter graph**)
10. Leave all other options as they are.
11. Click **Go** to view your data in the format requested.

Tuition Project

Table: CPI (Consumer Price Index) for Tuition Fees (N.B.)

Year	Consumer price index, 2001 basket content; New Brunswick; Tuition fees (Index, 1992=100)
1979	33.0
1980	35.6
1981	38.9
1982	44.7
1983	52.0
1984	55.6
1985	59.5
1986	64.4
1987	69.9
1988	74.5
1989	79.4
1990	84.5
1991	91.5
1992	100.0
1993	108.8
1994	113.4
1995	116.3
1996	124.7
1997	137.0
1998	150.0
1999	160.2
2000	169.5
2001	181.4
2002	194.3

Source: Statistics Canada, <http://www.statcan.ca>, extracted February 26, 2006, CANSIM, Table 326-0002 on E-STAT

Table 326-0002 - Consumer price index, 2001 basket content; New Brunswick; Tuition fees (Index, 1992=100)

Teacher Notes: Tuition Project

Sample Graph: CPI (Consumer Price Index) for Tuition Fees (N.B.)



Source: Statistics Canada, <http://www.statcan.ca>, extracted June 26, 2006
CANSIM on E-STAT

Survey or program details:

Table 326-0002: Consumer price index, 2001 basket content; New Brunswick;
Tuition fees (Index, 1992=100)

Geography: New Brunswick

Commodities and commodity groups: Tuition fees

Dates: 1979 to 2005

Lesson 5 Project 6: Cable Television Project

Statement for analysis: Canadians have become addicted to television.

Related articles from the Statistics Canada website:

- Daily article: <http://www.statcan.ca/Daily/English/020912/d020912a.htm>

Series III questions:

Describe the trends that can be seen in this dataset.

How would you explain the operating revenue in 2001?

What would you expect the operating revenue to be in 2007? Explain.

Instructions for accessing data:

Follow the instructions below to access this data for yourself. Instructions are given for students accessing the data from a school computer.

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and Enter** at the next screen.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. Choose **Table Number** and click **Continue** to search for this data.
5. Type in the table number (**353-0001**) and click **Continue**.
6. At the next screen, select the following information:
Geography: choose Canada
Operating and financial detail: choose Operating revenue, total
7. The data choices show the latest year of data available. Change the first date to 1976 (the earliest year with data). The dates should appear **From 1976 to 2001 (Annual data)**
8. Choose **Retrieve as individual Time Series**.
9. At the next screen, go to the **Output format selection** and choose either to view the data as a table (choose **HTML Table, time as rows** format), or as a scatter plot (choose **Scatter graph**)
10. Leave all other options as they are.
11. Click **Go** to view your data in the format requested.

Consumer Price Index Project

Table: Cable Television Industry

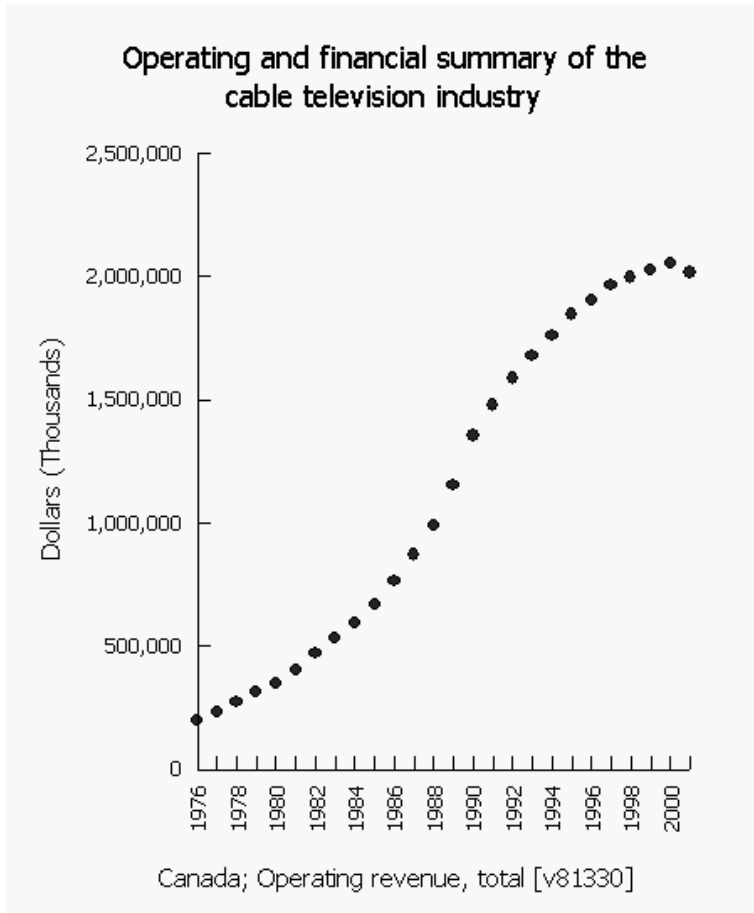
Annual	Operating and financial summary of the cable television industry; Canada; Operating revenue, total (Dollars - Thousands)
1976	199,250
1977	232,958
1978	273,223
1979	313,748
1980	352,171
1981	405,023
1982	472,344
1983	534,982
1984	595,057
1985	672,136
1986	767,039
1987	870,625
1988	989,509
1989	1,153,586
1990	1,356,621
1991	1,477,612
1992	1,588,093
1993	1,680,976
1994	1,759,126
1995	1,846,052
1996	1,903,555
1997	1,964,993
1998	1,995,895
1999	2,028,130
2000	2,055,956
2001	2,016,482

Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Table 353-0001 on E-STAT

Table 353-0001: Operating and financial summary of the cable television industry; Canada; Operating revenue, total (Dollars - Thousands)

Teacher Notes: Cable Television Project

Sample Graph: Cable Television Industry



Source: Statistics Canada, <http://www.statcan.ca>, extracted March 25, 2004
CANSIM, Table 353-0001 on E-STAT

Table 353-0001: Operating and financial summary of the cable television industry; Canada; Operating revenue, total (Dollars - Thousands)

Survey or program details:

Table 353-0001: Operating and financial summary of the cable television industry, Canada, Operating revenue, total

Geography: Canada

Operating and financial detail: Operating revenue, total

Dates: 1976 to 2001

Technology Section: Create a Dataset

Finding E-STAT Data in Census

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and enter** at the next screen.
If prompted, be prepared to enter the user I.D. and password for your school. Your site's user I.D. is available from the E-STAT home page by clicking [Educational institutions registered with E-STAT](#). Search for the name of your school (in alphabetical order) and you will find your site's user I.D. in square brackets. The site password is available from your network administrator.
3. Choose **Search Census** from the list on the left of the screen.
4. Choose **2001 Census** and click **Go!**
5. Select **2001 Census of Population (Provinces, Census Divisions, Municipalities)** and click **Go!**
6. **Profile** selection: Click the arrow to see all the choices, and select **2001 Census of Population: All Tables**, and then click **Go!**
7. At the next screen, make your choices based on your topic.
8. At the top of the main selection form, choose the **Geography** of interest, such as *2001 Provinces and Territories*, or *2001 - N.B. (15 counties)*.
9. When choosing **Characteristics**, click on the **View checklist** button. At the next screen, scroll down to put checkmarks in the boxes for the characteristics you wish to study. Go to the bottom of the checklist and click the button: **Back to Main Selection Form**.
10. At the bottom of the main selection form, choose the output format. Choose **Table: Area as Rows** to produce a usable data table. Choose a graphic format, such as **Scatter graph**, in order to draw a graph of the data.
11. To enhance or modify a graph click **Modify Graphic** under the graph.
This brings up a new screen with the following options:
 - You may modify the **title** (above the graph) or the **subtitle** (below the graph) by typing the desired text in the space provided.
 - You may overlay a **grid** on top of your graphs; this is especially useful for scatter graphs.
 - You may choose **Equally scaled axes for scatter graphs**. This is useful when the two characteristics in the scatter graph have the same units, (e.g. estimates of female population and male population by age group in 2000).Then click **Redraw**.
12. Buttons at the bottom of the table display page allow you to make calculations with this data or to make changes to the data included.

Note: The E-STAT website provides help through its **Help with this page** and **Contact E-STAT** buttons. These can be found in the left sidebar on all E-STAT webpages.

Finding E-STAT Data in CANSIM

1. Go to <http://estat.statcan.ca> and choose your language preference.
2. Click on **Accept and enter** at the next screen. If you are asked for a password, see Step 2 on the previous page.
3. Choose **Search CANSIM** from the list on the left of the screen.
4. You have several choices for finding information about your topic:
5. Click **Browse by subject** or **Browse by survey**. At the next screen, choose the folder which best fits the topic you have chosen.,
6. Choose **Search** to look for specific words from your topic or to specify a table number. Click **Search** to search for this data. You will be provided with several choices and will have to decide which choice best fits the information you require.
7. When you have selected your table, you will need to make other choices based on your topic.
8. When choosing characteristics from one of the dimensions, click on the **View checklist** button. At the next screen, scroll down and put checkmarks in the boxes for the characteristics you wish to study. Go to the bottom (or the top) of the checklist and click the button: **Return to picklist**.
9. The data choices show the latest year of data available. The first date box will provide a list of all dates for which there is any data. You can choose all the available data or any date range for your study.
10. Choose **Retrieve as individual Time Series**.
11. At the next screen, go to **output format** and choose your format. Under SCREEN OUTPUT formats choose **HTML, table: Time as rows** to produce a usable data table or under GRAPH formats choose **Scatter graph**, or any of the other graph types in order to draw a graph of your data.
12. If the frequency of the data is quarterly, you can change this to annual data by choosing to change the **frequency of the output data** to **Converted to Annual (average)**. This is found by clicking on **Manipulate data** at the bottom of the Output specification page.
13. Click **Retrieve now** to view your data in the format requested.
14. To enhance or modify a graph click **Modify Graphic** under the graph.

This brings up a new screen with the following options:

 - You may modify the **title** (above the graph) or the **subtitle** (below the graph) by typing the desired text in the space provided.
 - You may modify the **type of graph** and the years included in your graph
 - You may overlay a **grid** on top of your graphs; this is especially useful for scatter graphs.
 - You may choose to **Start axis at 0** for all types of graphs except for vertical and horizontal stacked bar charts. Users can see small variations in the data values when the axis begins at an automatically-determined non-zero value, since the data better fills the space available (i.e. the graph is of a larger scale).
 - You may choose "**Equally scaled axes for scatter graphs**". This is useful when the two characteristics in the scatter graph have the same units (e.g., estimates of Nova Scotia population and New Brunswick population over time).

Then click **Replot**.

15. The other options on this page allow you to make changes to the data including adding information from other series of data.

Note: The E-STAT website provides help through its **Help with this page** and **Contact E-STAT** buttons. These can be found in the left sidebar on all E-STAT webpages.

Outcomes for the Integration of Information Technologies

By the end of Grade 9, in addition to Grade 6 outcomes

Basic Operations and Concepts	Social, Ethical, and Human Issues	Productivity	Communication	Research, Problem Solving, and Decision Making
<p>BOC 9.1 operate a wide variety of school media, computer, and other educationally appropriate equipment for learning, communication, and the representation of their learning, independently and safely with teacher supervision</p> <p>BOC 9.2 (relates to 6.2) use and create information texts in a range of media, using specialized text features of those media to support the communication, with teacher assistance</p> <p>BOC 9.3 (relates to 6.3) demonstrate comfort with keyboarding and manipulation of computer input and peripheral devices as they work</p> <p>BOC 9.4 (relates to 6.4) manage their electronic files and correspondence efficiently</p>	<p>SEHI 9.1 (relates to 6.1, 6.2, 6.3) demonstrate understanding of the nature of technology and its impacts on different societies and environments; using technology, in local and global contexts, with due regard for the legal and human rights of others</p> <p>SEHI 9.2 (relates to 6.3, 6.4, 6.5, 6.6) identify and demonstrate the values and techniques of mass media, popular culture, and electronic information environments, and evaluate the effects of these techniques</p> <p>SEHI 9.3 (relates to 6.7, 6.8) understand, model, and assume personal responsibility for the acceptable use of copyrighted and other information resources</p> <p>SEHI 9.4 (relates to 6.2, 6.7, 6.8) demonstrate an understanding of, and a commitment to, accuracy, and ethical behaviour, and personal privacy and safety as they create and distribute information about themselves, others, and curriculum topics under study</p>	<p>PTS 9.1 (relates to 6.3) use software to brainstorm, develop a thought web, outline, and map ideas under study with independence</p> <p>PTS 9.2 (relates to 6.1, 6.2, 6.4, 6.5) explore curriculum concepts under study using specialized software; measuring, sampling and recording equipment; and computer-based simulations, with teacher assistance</p> <p>PTS 9.3 (relates to 6.1, 6.2, 6.4, 6.5, 6.7) explore the curriculum through a wide range of print and electronic forms; accessing and processing information by means of the specialized techniques associated with the technology they select</p> <p>PTS 9.4 (relates to 6.5, 6.6) create and manipulate sound, images and video, using digital equipment and computer-based editing, to represent their learning for particular audiences and purposes, independently with teacher supervision</p>	<p>CT 9.1 (relates to 6.3, 6.5) use language, in a range of aural, print, media and electronic forms to explore and express their perceptions, feelings, ideas and attitudes; refine their thinking; and interact, negotiate and collaborate with others in order to build their understanding</p> <p>CT 9.2 (relates to 6.1) design and build intranet or Internet websites of student-produced pages about a curriculum topic, in small groups with teacher supervision</p> <p>CT 9.3 (relates to 6.1-6.5) critically evaluate how style, form, source, and medium influence the accessibility, validity and meaning of information with independence</p>	<p>RPSD 9.1 (relates to 6.2) select appropriate measuring and recording devices and/or software to collect data, discover patterns of change over time, solve problems and make logical decisions based on their investigations; with teacher assistance</p> <p>RPSD 9.2 (relates to 6.1, 6.2) create and use electronic charts, maps, tables, graphs, spread sheets and databases to collect, analyse and display data independently</p> <p>RPSD 9.3 (relates to 6.1, 6.2) write and represent their research using the structures, features, conventions, and techniques of specialized publication and presentation formats with growing fluency</p> <p>RPSD 9.4 (relates to 6.3, 6.4) assess the quality, comprehensiveness, biases, and perspectives of print, media and electronic resources for use in their curricular studies, with teacher guidance</p>

Basic Operations and Concepts	Social, Ethical, and Human Issues	Productivity	Communication	Research, Problem Solving, and Decision Making
<p>BOC 9.5 (relates to 6.1, 6.2, 6.3, 6.4) from a range of resource options, knowledgeably select, manage, and use technological resources to solve curriculum problems, and enhance their learning, with</p>	<p>SEHI 9.5 (relates to 6.2, 6.7, 6.8) identify technology-related career opportunities of personal interest, and begin to assess their strengths and interests with respect to technology</p>	<p>PTS 9.5 (relates to 6.4, 6.5, 6.6) develop multimedia presentations, based on sound principles of design, with increasing confidence, efficiency and independence</p>		<p>RPSD 9.5 (relates to 6.1 – 6.4) critically evaluate how style, form, source, and medium influence the accessibility, validity, and meaning of information independently</p>
<p>BOC 9.6 (relates to 6.6) understand and use a wide range of terminology related to the technology they use for learning</p>	<p>SEHI 9.6 (relates to 6.8) follow the Internet Access and Use Policy</p>	<p>PTS 9.6 use information and communication technology to explore increasingly complex numerical and spatial situations for the purpose of developing and testing conjectures</p>		<p>RPSD 9.6 (relates to 6.3, 6.4) select and refine a research topic, according to teacher-provided criteria, to fulfill a curriculum requirement, with teacher assistance</p>
<p>BOC 9.7 (relates to 6.7) work safely as they use ICT, applying basic troubleshooting techniques to assess equipment and software problems that affect their use of ICT; then provide anecdotal information which may be of help to maintenance</p>				<p>RPSD 9.7 (relates to 6.1 – 6.4) assess the strengths and limitations of different approaches to research, then select those approaches which more efficiently meet their learning needs, with teacher assistance</p>
				<p>RPSD 9.8 (relates to 6.1 – 6.4) experience comfort, security and clarity that well-researched solutions and conclusions are valid and reliable, though uncommon or unexpected</p>
				<p>RPSD 9.9 (relates to 6.5) accurately and independently cite information sources</p>