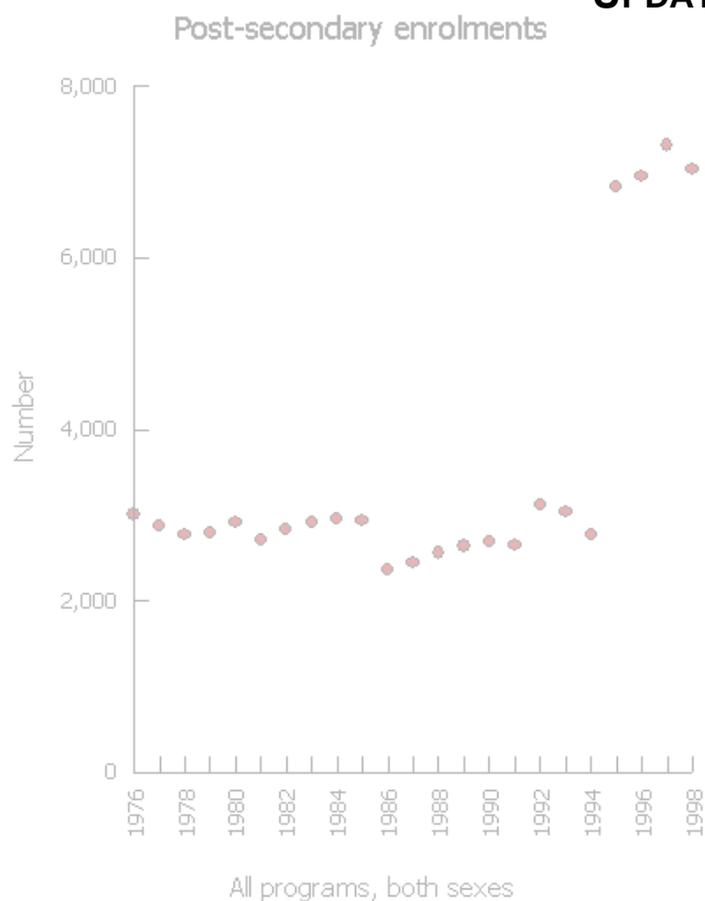


MATHEMATICS

GRADE 9

DATA MANAGEMENT USING E-STAT

DRAFT
UPDATED SEPT. 2009



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Teacher Notes

Lesson 1: Characteristics of Scatterplots

Purpose:

Students learned to construct scatterplots in grade 8. In this lesson the dispersion of points in a scatterplot is examined as we discuss the correlation that exists between the two variables.

Outcome:

F1 describe characteristics of possible relationships shown in scatterplots

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 scatterplots. (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 scatterplots?
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, discrete data.

Technology:

Students could create these scatterplots in E-STAT on the Statistics Canada website (<http://www.statcan.gc.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.

Teachers can also encourage their students to use E-STAT at home. First show your students the different supports (such as the **Help with this page** button) available on the left side bar from within E-STAT.

The following steps will lead you to a section on scatterplots 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.

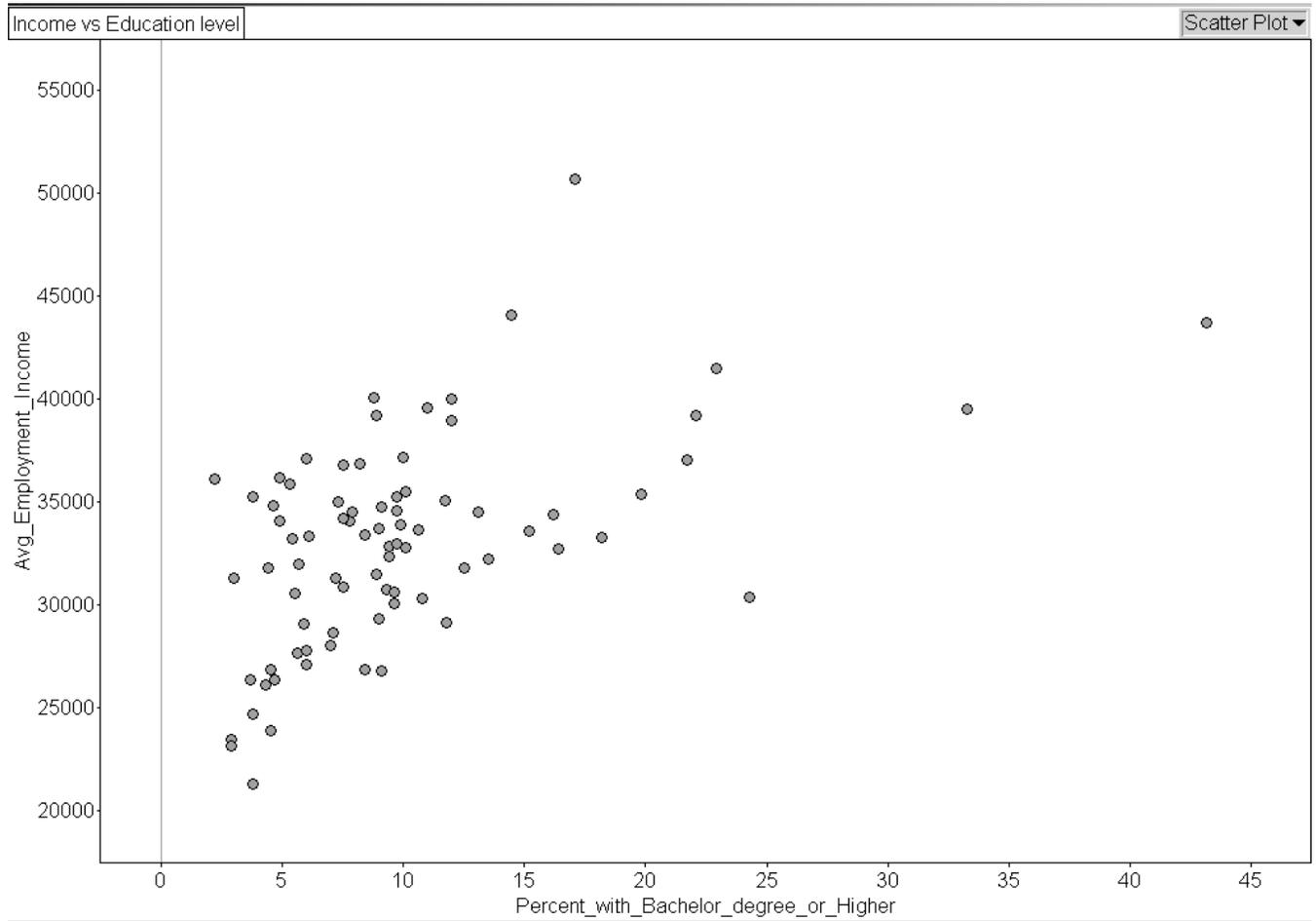
1. Go to <http://www.statcan.gc.ca>
2. From the bar on the left, select **Learning Resources**
3. Select **Students**
4. Scroll down and select **Statistics: Power from Data!**
5. Under the heading **Graph** types, select **Scatterplots**

From the scatterplot screen referenced in #5 above, along the left side is “Create your own 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 – Scatterplot Examples

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

Note: Each point represents the average values for one municipality in Nova Scotia.

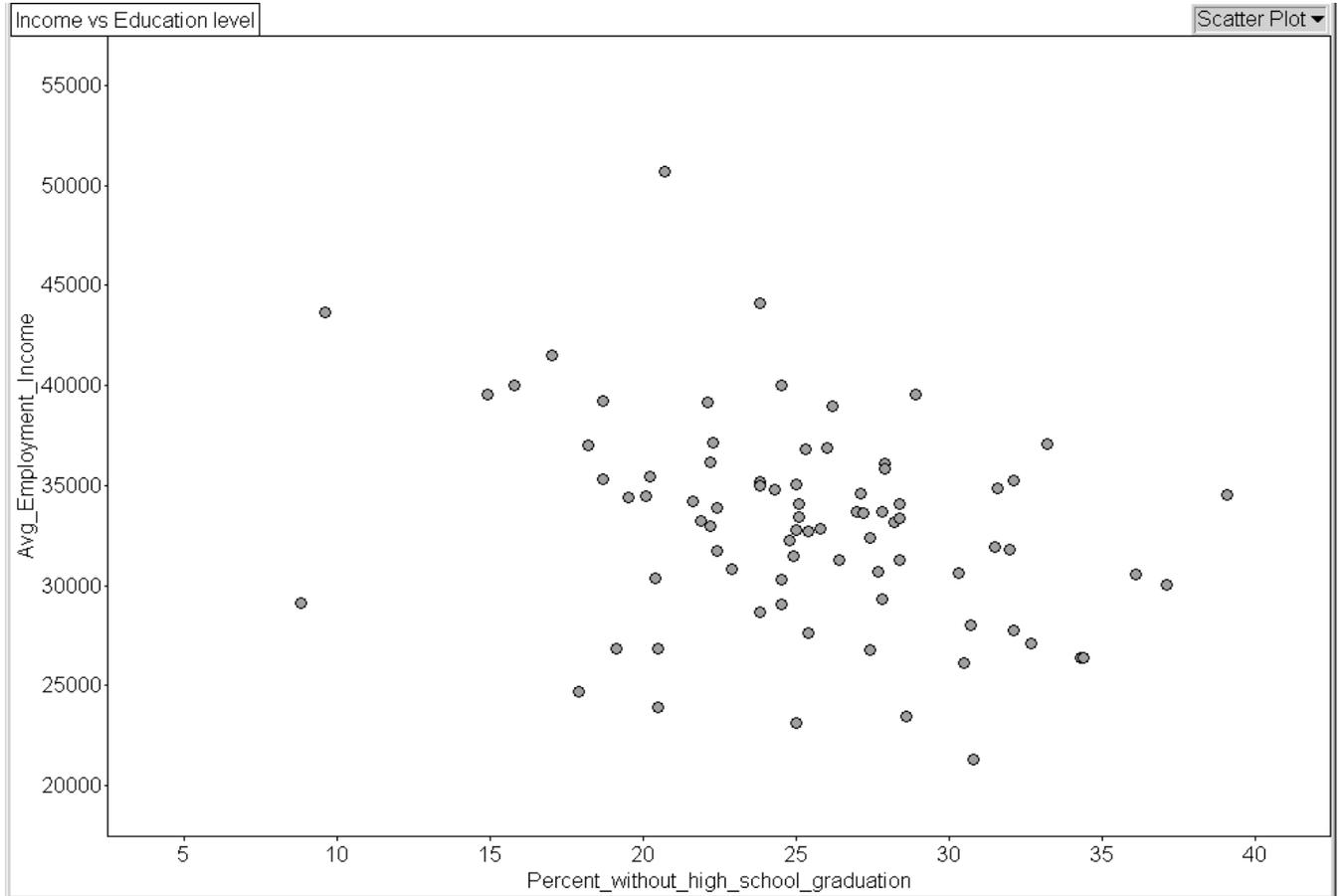


Source: Statistics Canada, <http://www.statcan.gc.ca>, extracted March 25, 2004

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 Nova Scotia

Each point represents the average values for one municipality in Nova Scotia.

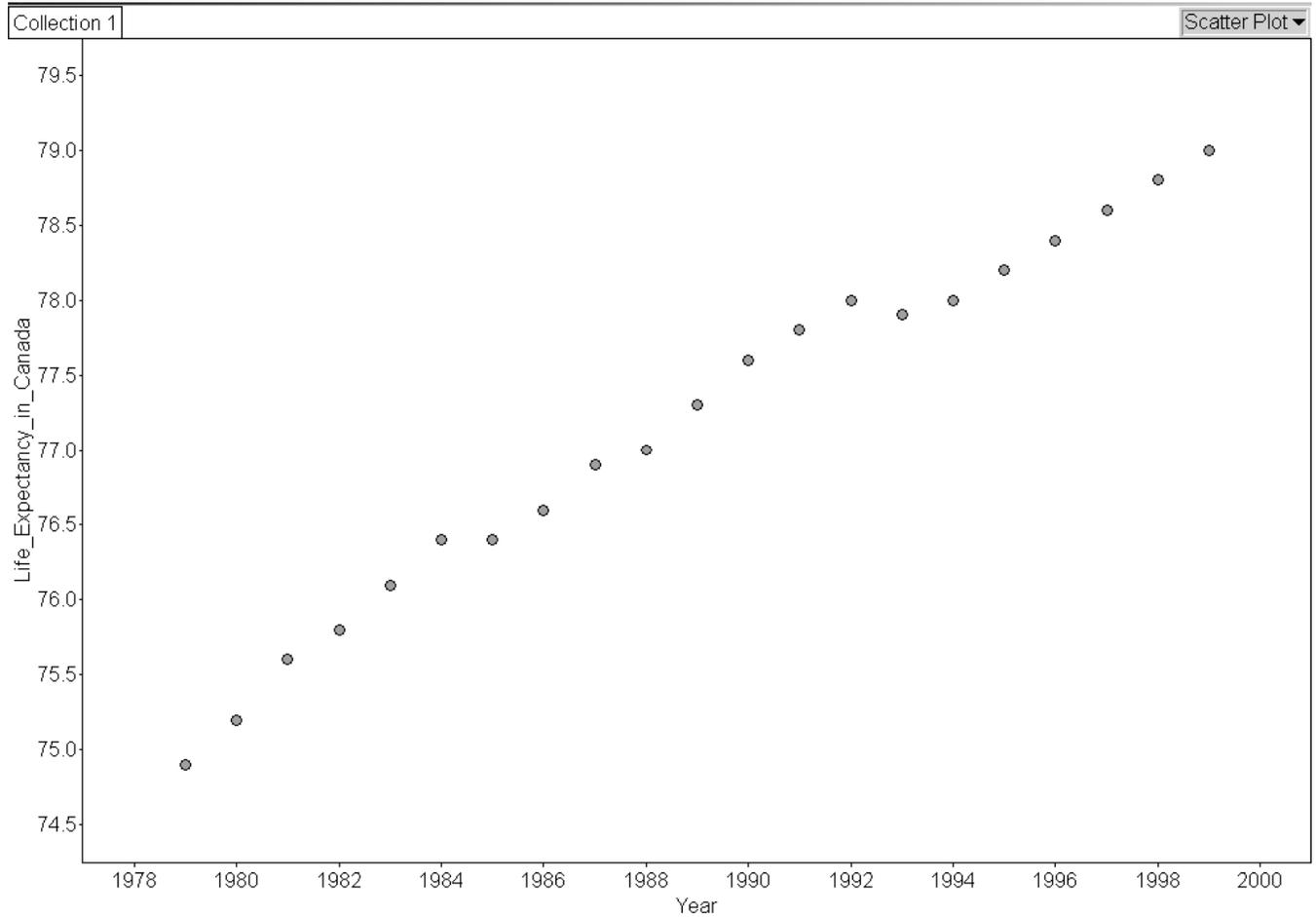


Source: Statistics Canada, <http://www.statcan.gc.ca>, extracted March 25, 2004

Lesson 1:

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

Each point represents the data for one year.

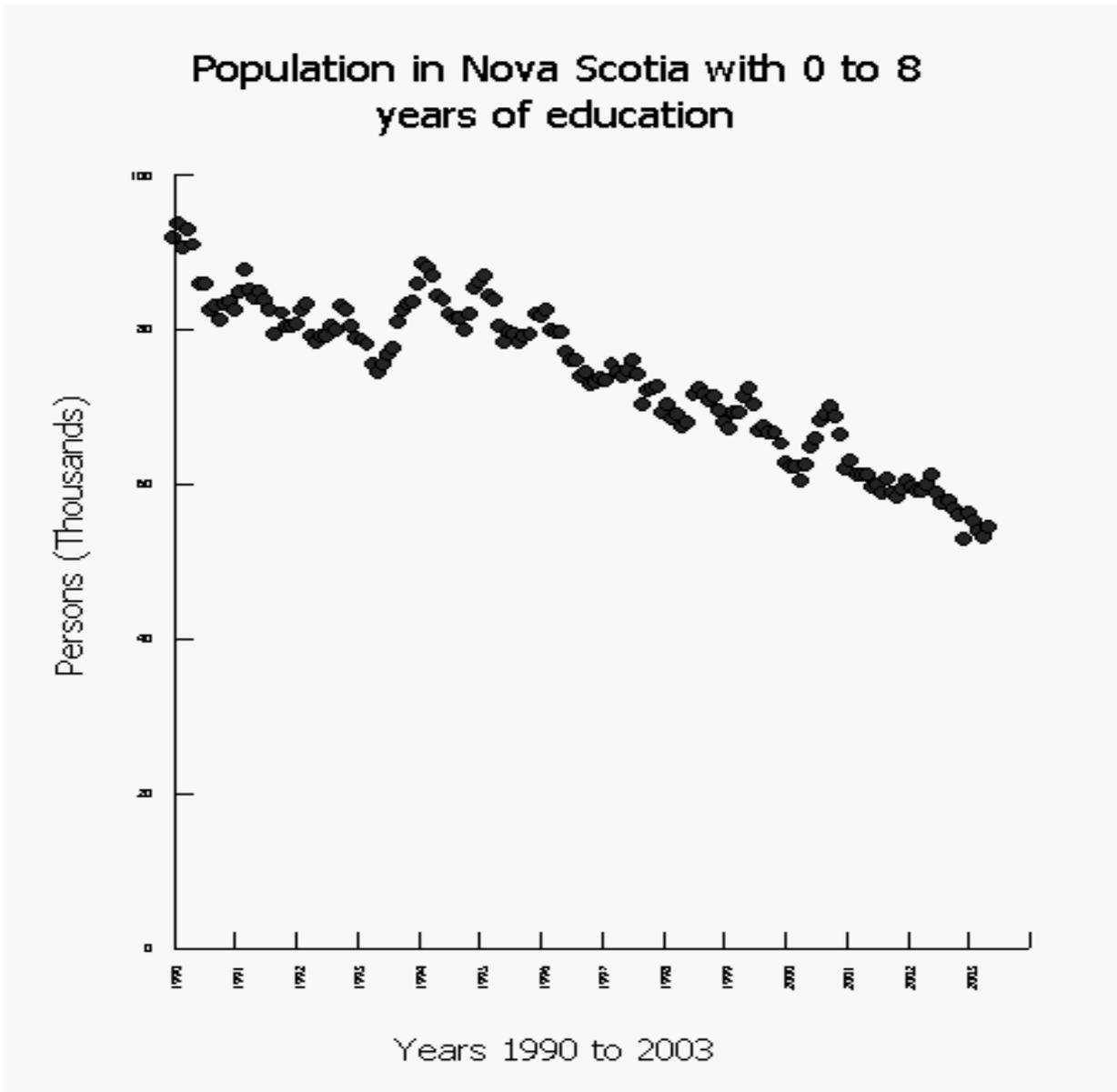


Source: Statistics Canada, <http://www.statcan.gc.ca>, extracted March 25, 2004

Lesson 1:

Graph 4: Population in Nova Scotia with 0 to 8 years of Education since 1990

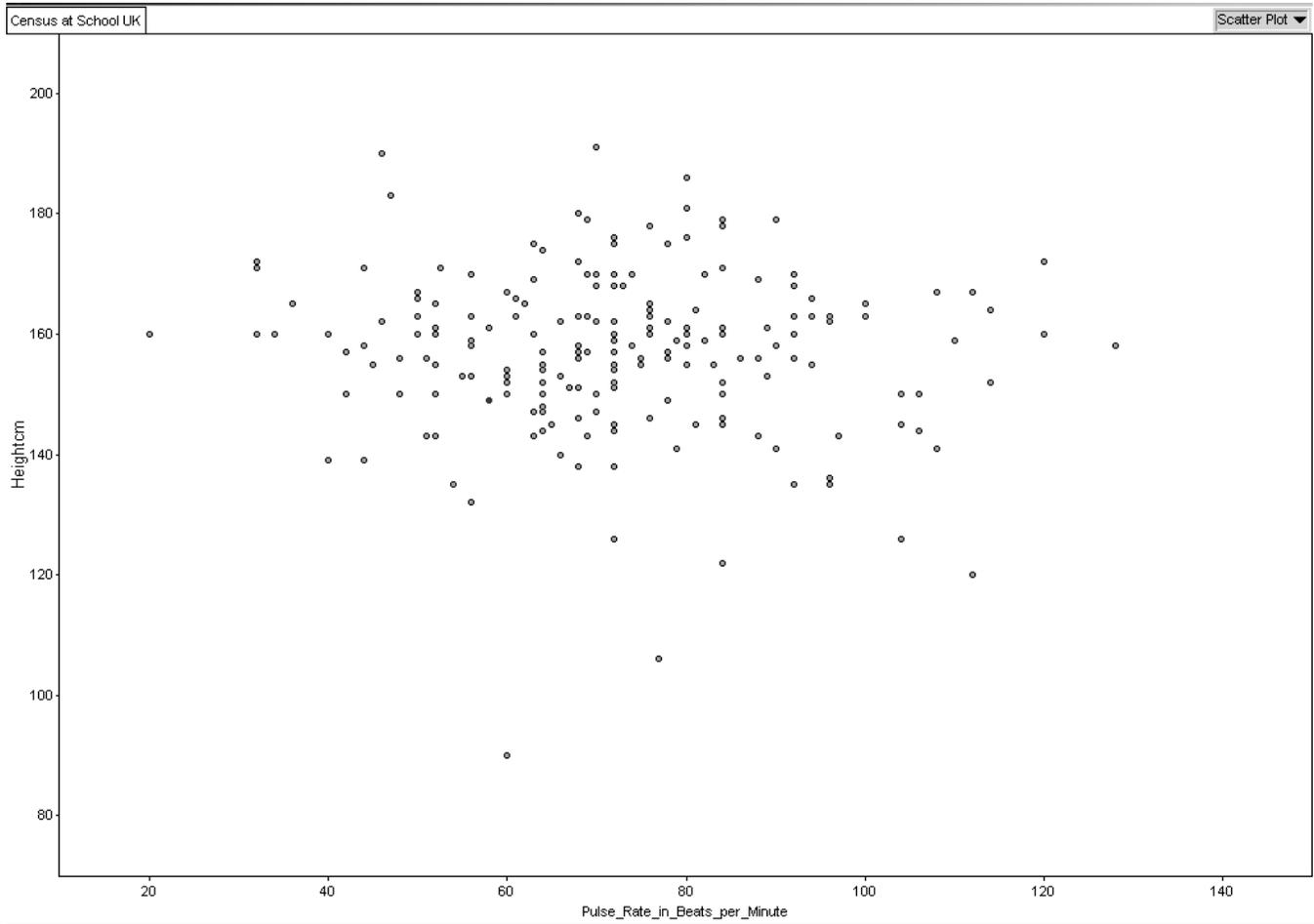
Each point represents the data for one month



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

Lesson 1:

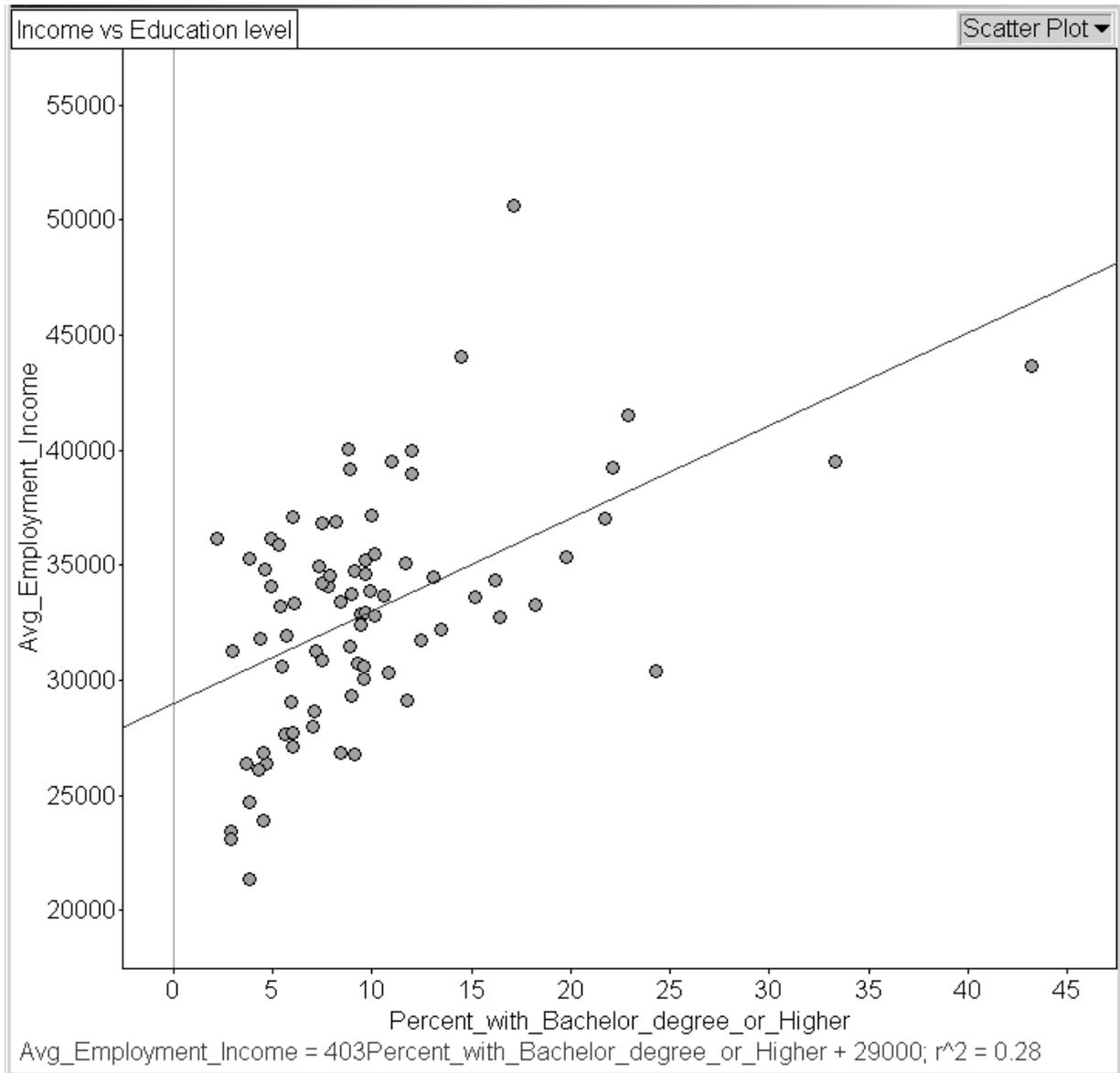
Graph 5: Height vs Pulse Rate from Census at School Project



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.gc.ca/>, extracted March 25, 2004

Census: 2001 Census

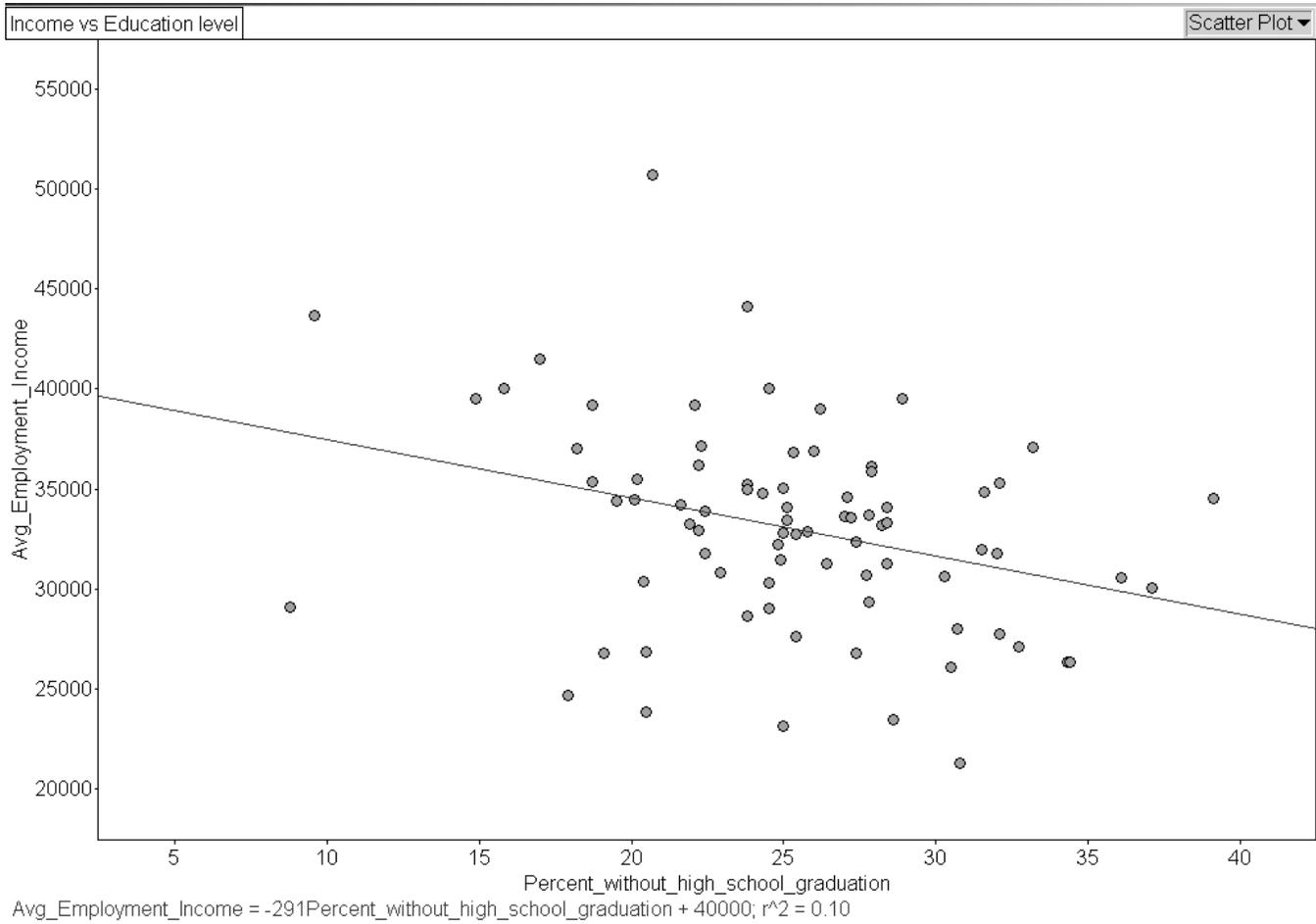
Profile: 2001 School Attendance, Education, Field of Study, Highest Level of Schooling and Earnings for Nova Scotia municipalities

File names on disc:

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

Teacher Notes for Lesson 1 Activity Sheets

Graph 2: Weak Negative Correlation



Source: Statistics Canada, <http://www.statcan.gc.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

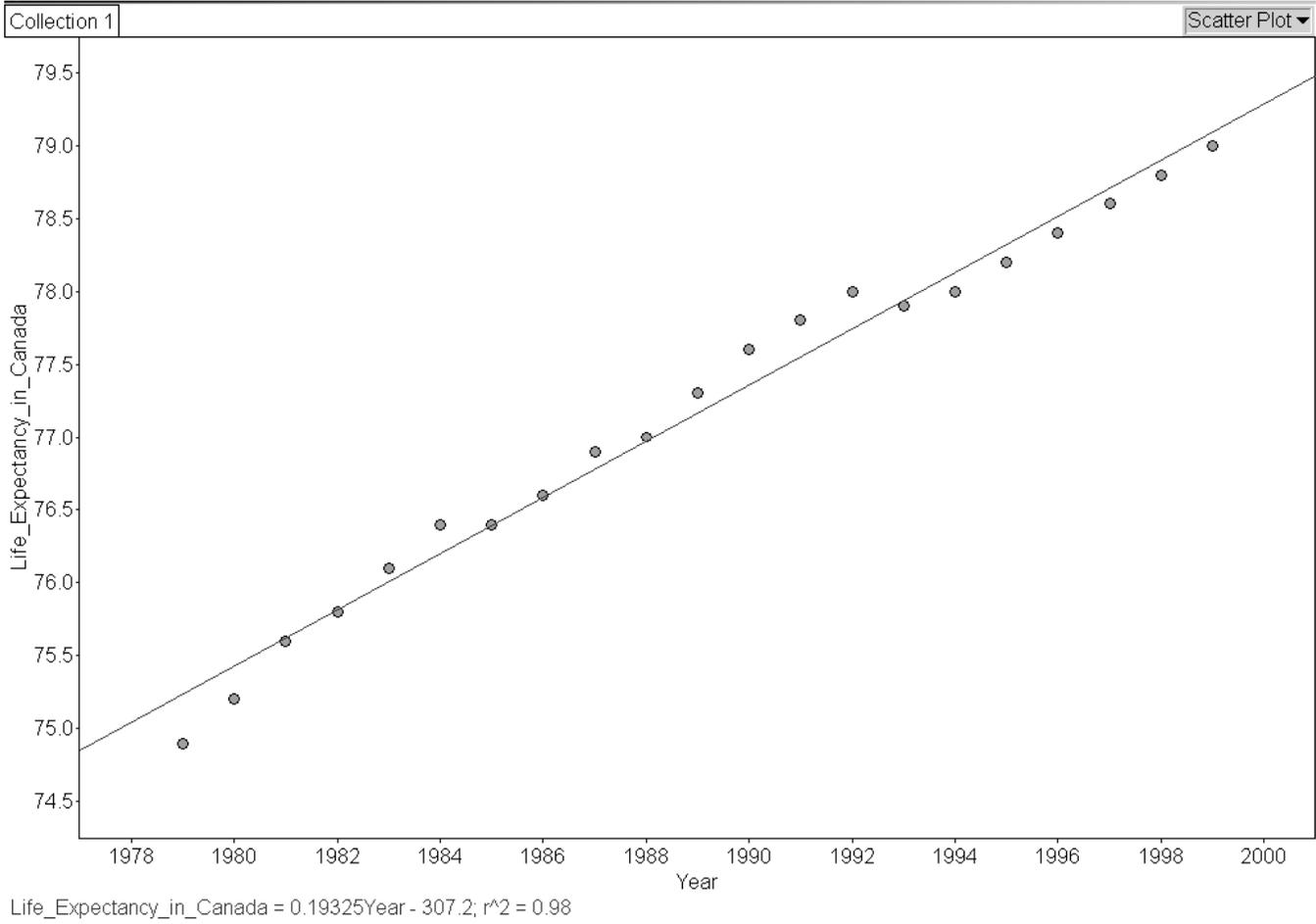
File names on disc:

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

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.gc.ca/>, extracted March 25, 2004

Data: CANSIM Table 102-0025

File names on disc:

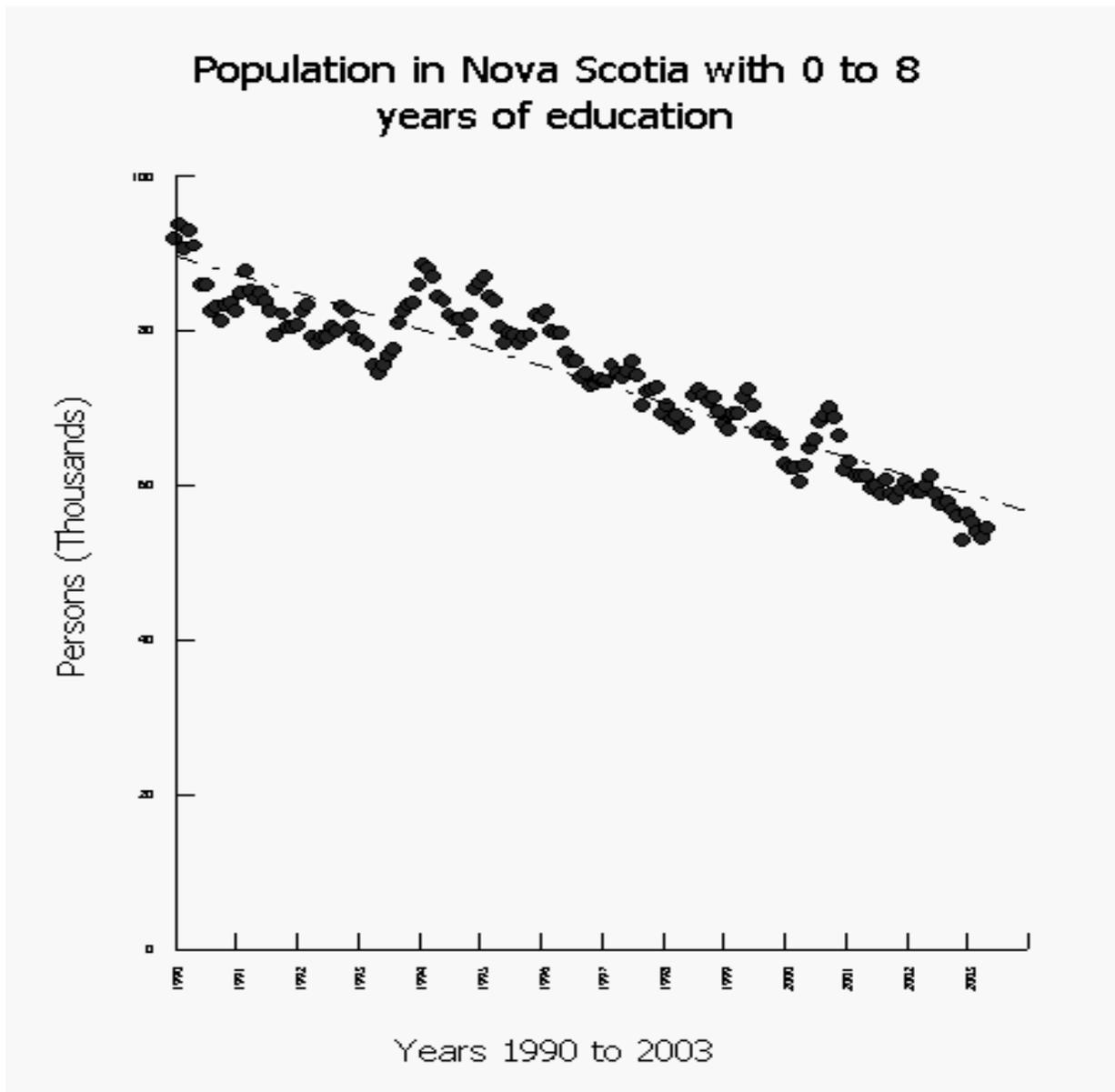
Fathom: Life_Expec_Can_NS_NB.ftm

Spreadsheet (e.g., Excel): Life_Expec_Can_NS_NB.csv

Teacher Notes for Lesson 1 Activity Sheets

Graph 4: Strong Negative Correlation

Each point represents the data for one month



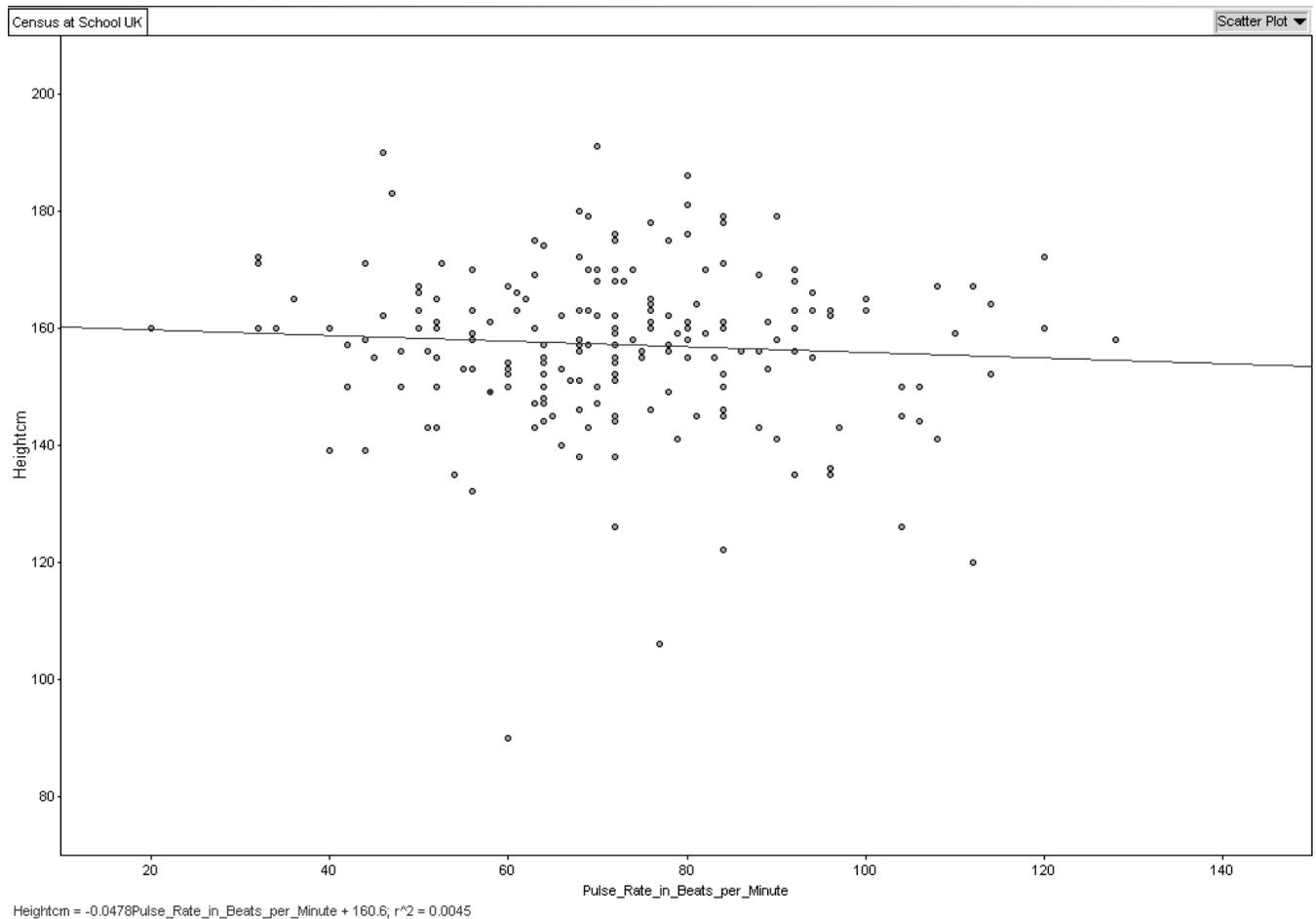
Source: Statistics Canada, <http://www.statcan.gc.ca/>, extracted March 25, 2004

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 scatterplots individually or in small groups. They have already worked with lines of best fit in grade 8.

1. Using the five scatterplots 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 scatterplot might be different
 - c) for which scatterplots(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 scatterplots 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 scatterplots 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.gc.ca/> under **Learning Resources**. If needed, the E-STAT website provides help through its **Help using this page**, **Help/Frequently asked questions**, **User guides and lesson plans**, and **Contact E-STAT** buttons. These can be found in the left sidebar on all E-STAT webpages.

Lesson 2: Activity Sheets

Table 1: Male vs Female Median Income for the North Shore of NS

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

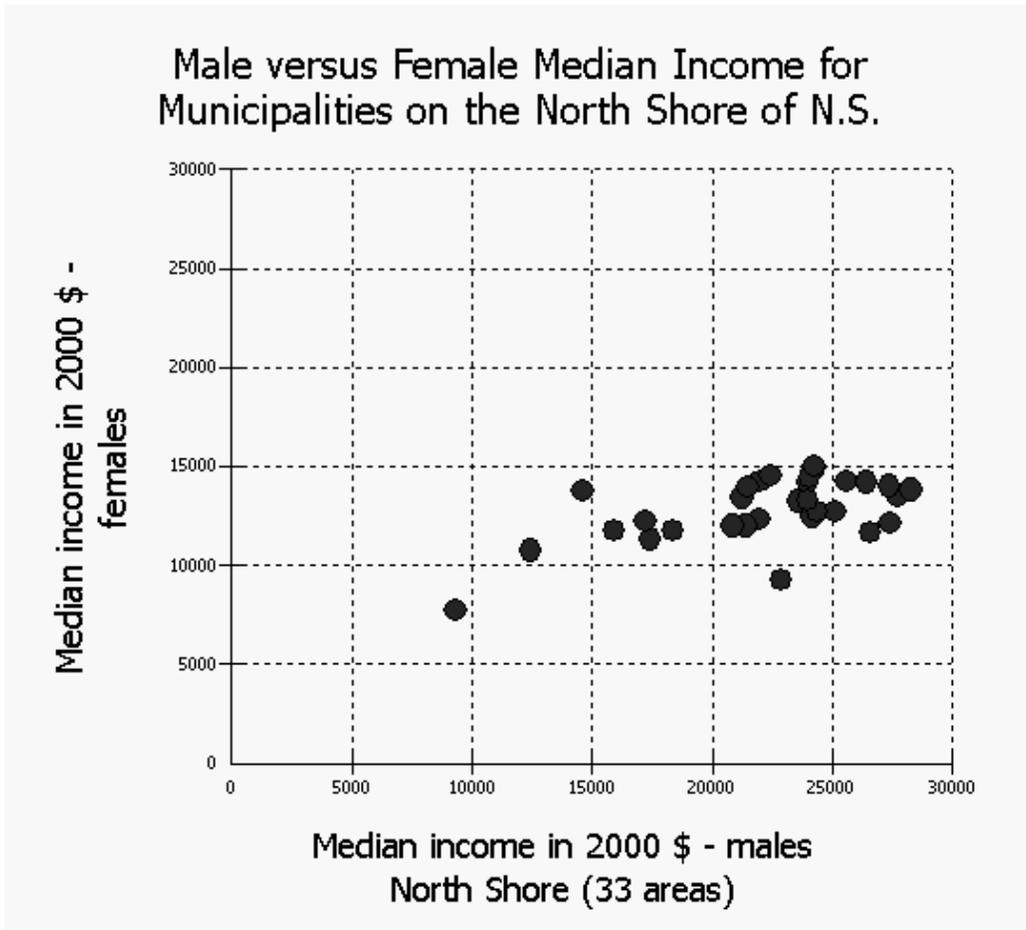
Source: Statistics Canada, <http://www.statcan.gc.ca/>, extracted March 25, 2004

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

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 NS



Source: Statistics Canada, <http://www.statcan.gc.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 NS since 1979

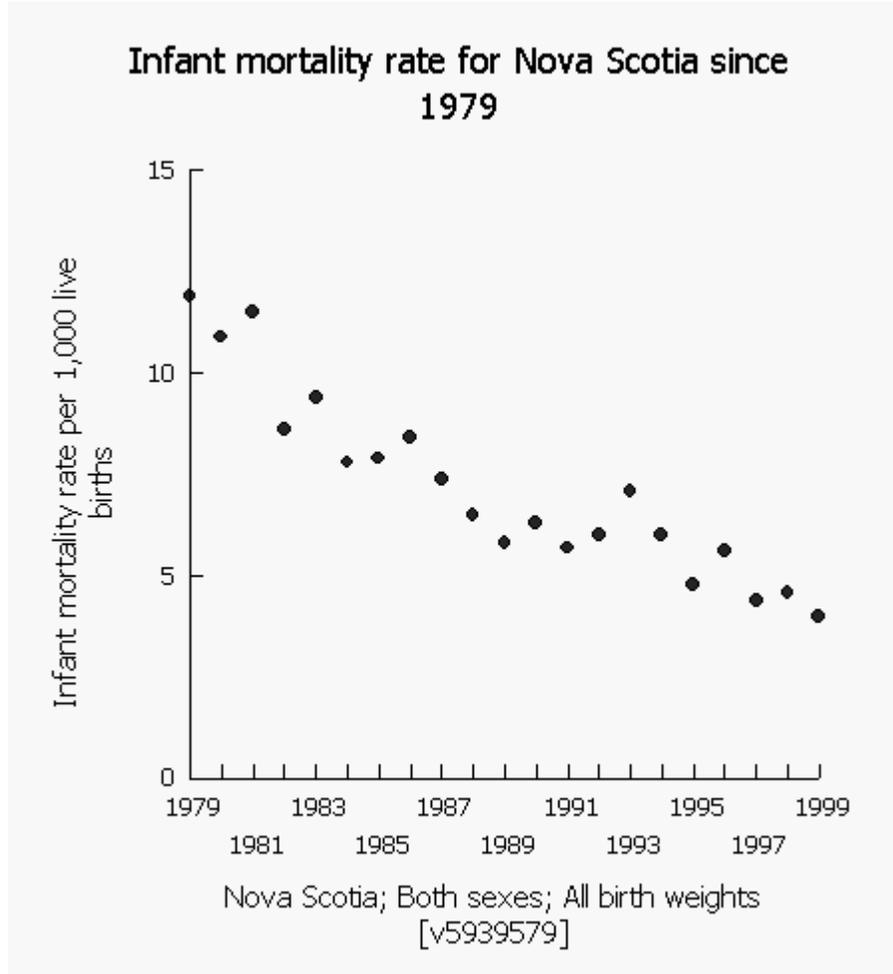
Year	Infant mortality rate per 1,000 live births (NS)
1979	11.9
1980	10.9
1981	11.5
1982	8.6
1983	9.4
1984	7.8
1985	7.9
1986	8.4
1987	7.4
1988	6.5
1989	5.8
1990	6.3
1991	5.7
1992	6.0
1993	7.1
1994	6.0
1995	4.8
1996	5.6
1997	4.4
1998	4.6
1999	4.0

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

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

Lesson 2:

Graph 2: Infant mortality rate for NS since 1979



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

Survey or program details:

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

Geography: Nova Scotia

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

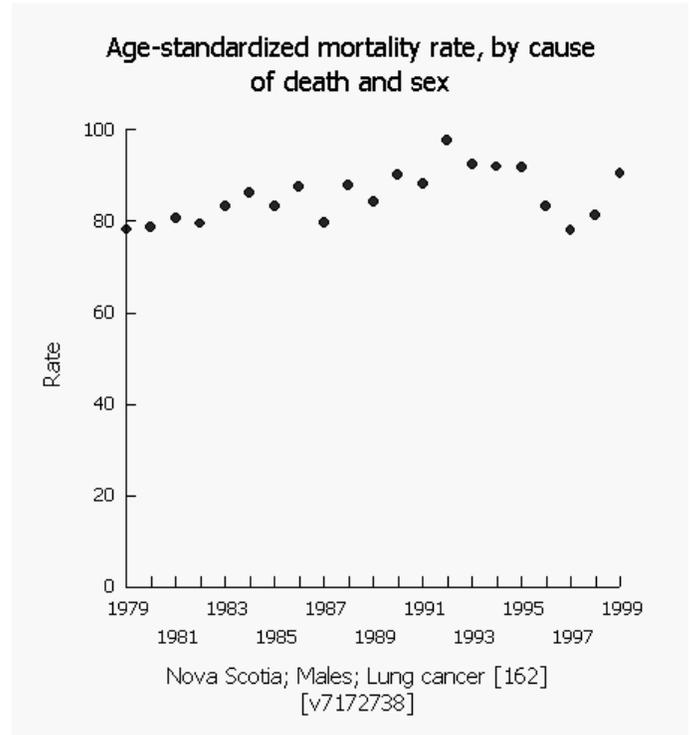
Year	Males	Females
1979	78.2	21.2
1980	78.7	19.4
1981	80.7	18.3
1982	79.5	19.8
1983	83.2	17.1
1984	86.2	24.5
1985	83.2	25.9
1986	87.5	27.6
1987	79.6	28.8
1988	87.8	29.0
1989	84.3	31.0
1990	90.1	34.4
1991	88.3	32.6
1992	97.7	36.4
1993	92.4	34.1
1994	91.9	33.8
1995	91.8	34.2
1996	83.3	40.3
1997	78.0	42.2
1998	81.3	40.9
1999	90.4	43.2

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

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.gc.ca/>, extracted March 25, 2004

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: Nova Scotia

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

Teacher Notes

Lesson 3: Examining curves of best fit

Purpose:

In this lesson, students will examine scatterplots 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 3 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 Nova Scotia, 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 3 steps for Graph 2: Female Enrolments in Engineering and Applied Sciences.

Teacher Notes

1. 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.
2. 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.
3. 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

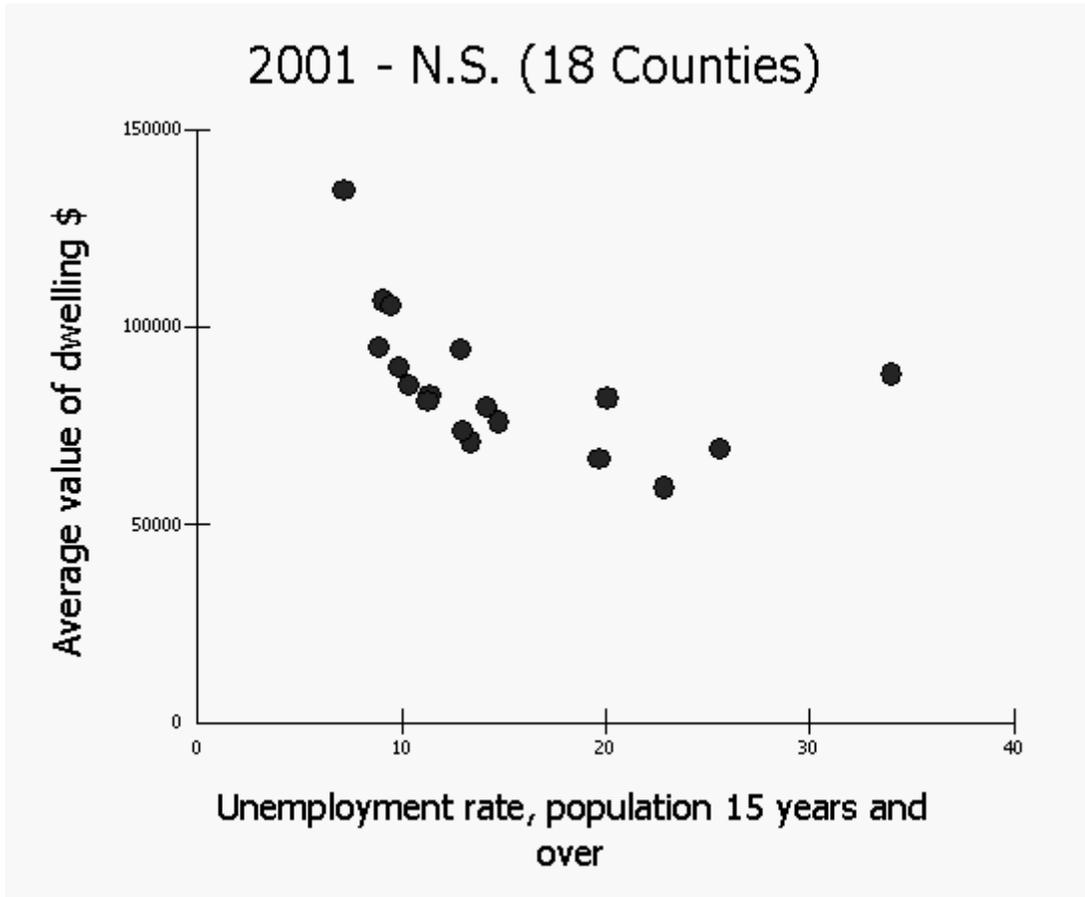
Area Name:	Unemployment rate, population 15 years and over	Average value of dwelling \$
Nova Scotia - Annapolis County	11.4	82,493
Nova Scotia - Antigonish County	12.9	94,281
Nova Scotia - Cape Breton County	19.7	66,482
Nova Scotia - Colchester County	9.9	89,745
Nova Scotia - Cumberland County	13.4	70,746
Nova Scotia - Digby County	13.0	73,338
Nova Scotia - Guysborough County	22.9	59,216
Nova Scotia - Halifax County	7.2	134,286
Nova Scotia - Hants County	8.9	94,527
Nova Scotia - Inverness County	20.1	81,732
Nova Scotia - Kings County	9.1	106,553
Nova Scotia - Lunenburg County	9.5	105,113
Nova Scotia - Pictou County	14.8	75,718
Nova Scotia - Queens County	11.3	81,101
Nova Scotia - Richmond County	25.6	68,864
Nova Scotia - Shelburne County	14.2	79,574
Nova Scotia - Victoria County	34.0	87,817
Nova Scotia - Yarmouth County	10.4	85,105

Source: Statistics Canada, <http://www.statcan.gc.ca/>, extracted May 14, 2004

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

Lesson 3:

Graph 1: Unemployment Rate vs Average Value of Dwelling



Source: Statistics Canada, <http://www.statcan.gc.ca/>, extracted May 14, 2004

E-STAT database for schools

Census: 2001 Census

Census Database: Provinces, Census Divisions, Municipalities

Profile: 2001 Census of Population, ALL TABLES

Geography: Nova Scotia (18 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 \$
Nova Scotia - Halifax County	8.7	113,628
Nova Scotia - Kings County	11	90,807
Nova Scotia - Colchester County	12.1	76,258
Nova Scotia - Antigonish County	12.5	79,397
Nova Scotia - Lunenburg County	12.6	89,391
Nova Scotia - Hants County	12.6	80,314
Nova Scotia - Yarmouth County	13	77,609
Nova Scotia - Annapolis County	14.8	72,556
Nova Scotia - Pictou County	15.1	67,720
Nova Scotia - Queens County	16.2	66,824
Nova Scotia - Cumberland County	16.4	64,685
Nova Scotia - Digby County	18	60,688
Nova Scotia - Shelburne County	19	65,912
Nova Scotia - Guysborough County	22.3	51,406
Nova Scotia - Cape Breton County	22.7	63,773
Nova Scotia - Inverness County	23.4	70,777
Nova Scotia - Richmond County	27.9	59,502
Nova Scotia - Victoria County	38.4	74,042

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

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

E-STAT database for schools

Census: 1996 Census

Profile: 1996 Census of Population, ALL TABLES

Geography: Nova Scotia (18 Counties)

Characteristics:

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

Lesson 3:

Table 2: Female Enrolments in Engineering and Applied Sciences

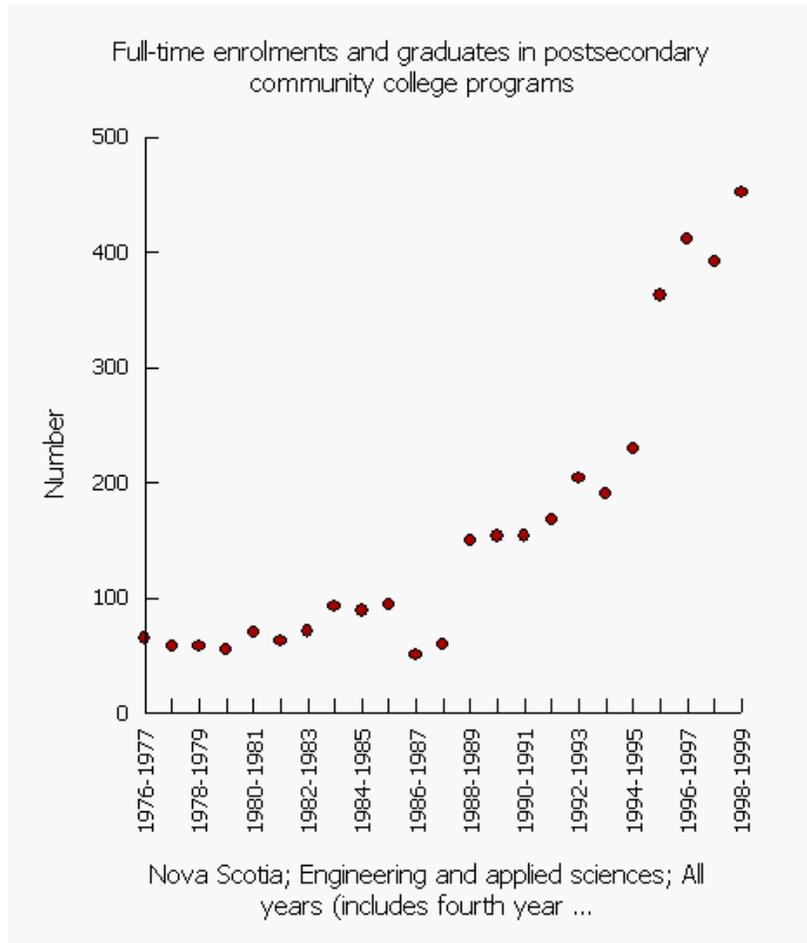
School Year	Female enrolments in engineering and applied sciences in NS
1976-77	65
1977-78	58
1978-79	58
1979-80	55
1980-81	70
1981-82	63
1982-83	71
1983-84	93
1984-85	89
1985-86	94
1986-87	51
1987-88	60
1988-89	150
1989-90	154
1990-91	154
1991-92	168
1992-93	204
1993-94	191
1994-95	230
1995-96	363
1996-97	412
1997-98	392
1998-99	452

Source: Statistics Canada, <http://www.statcan.gc.ca/>, extracted March 25, 2004
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.gc.ca/>, extracted March 25, 2004
CANSIM, Table 477-0006 on E-STAT

Survey or program details:

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

Geography: Nova Scotia

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

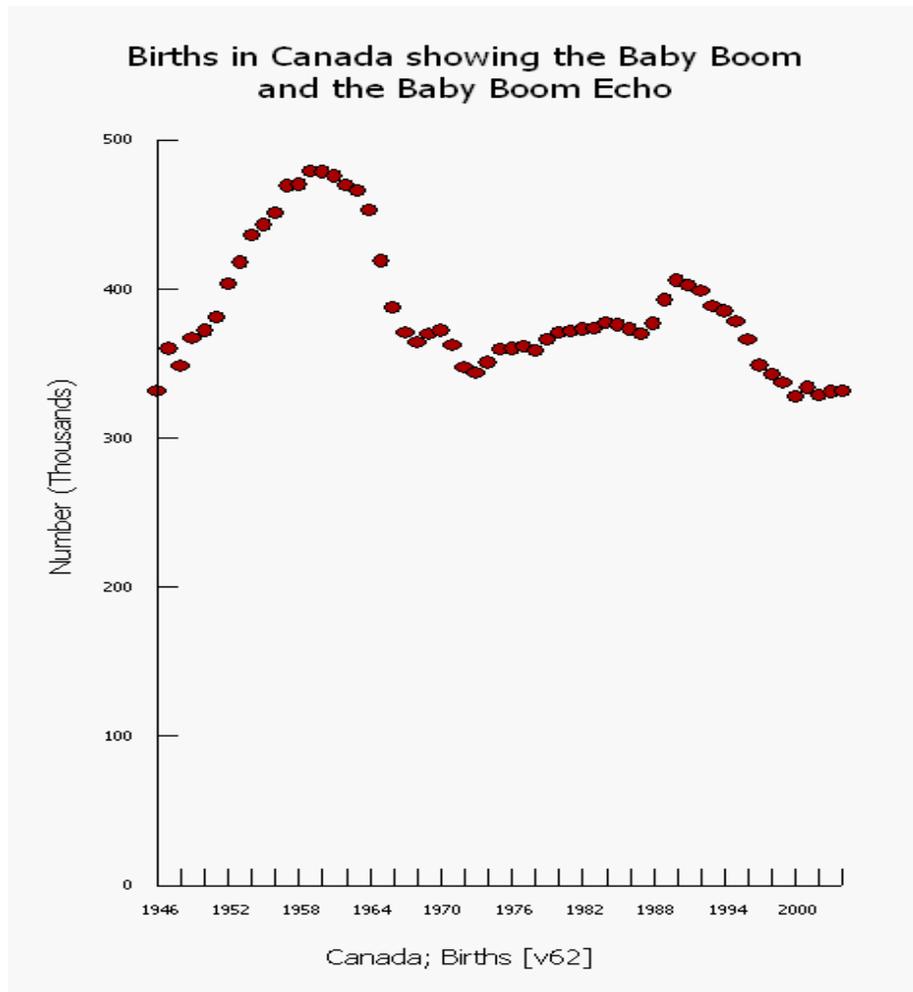
Computed annual total	Births
1974	345,645
1975	359,323
1976	359,987
1977	362,208
1978	358,410
1979	366,064
1980	370,709
1981	371,346
1982	373,082
1983	373,689
1984	377,031
1985	375,727
1986	372,912
1987	369,742
1988	376,795
1989	392,661
1990	405,486
1991	402,528
1992	398,643
1993	388,394
1994	385,114
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.gc.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.gc.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

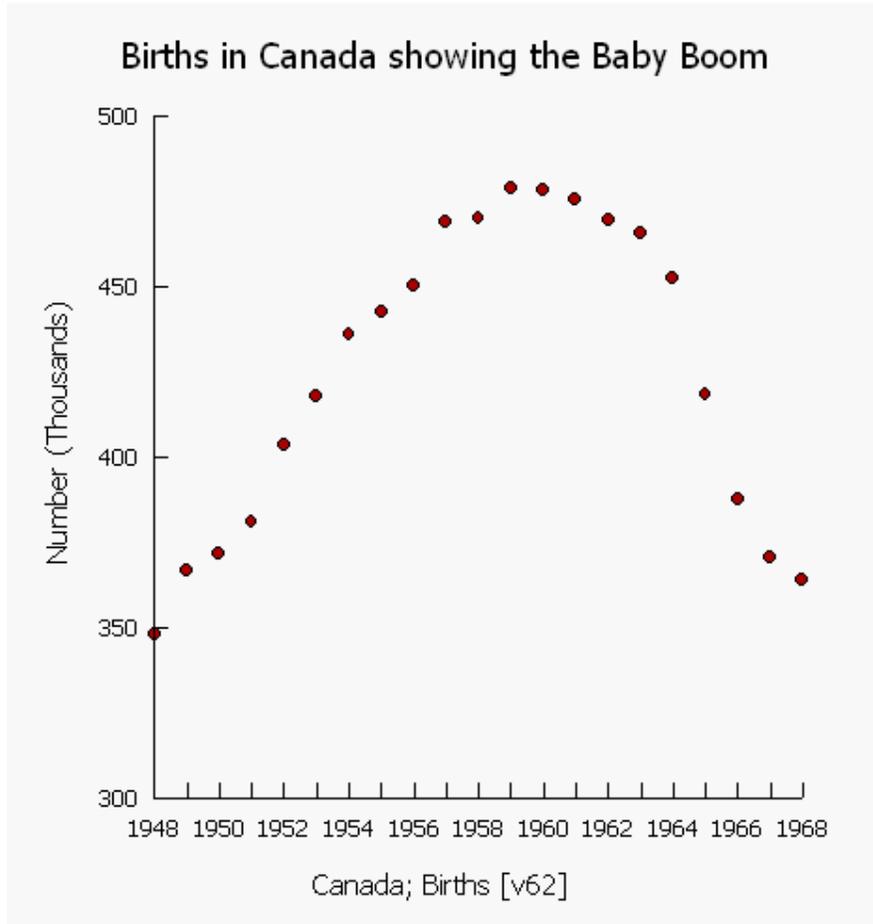
Estimates: Births

Frequency: converted to annual (sum)

Dates: Mar. 1946 to March. 2005

Lesson 3:

Graph 4: Births in Canada, 1948 to 1968



Source: Statistics Canada, <http://www.statcan.gc.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 Censuses in E-STAT** 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.S. (18 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: **Return to selection page.**
9. At the bottom of the main selection form, choose the output format. The choices used for this graph were **HTML Table (Geography=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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**477-0006**) and click the **Search** button.
5. At the next screen, select the following information:
Geography: choose **Nova Scotia**
Program field: choose **Engineering and applied sciences**
Year in program: choose **All years (includes fourth year students)**
Sexes: choose **Females**
6. 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)**
7. Choose **Retrieve as individual Time Series**.
8. 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**.
9. Leave all other options as they are.
10. Click **Retrieve now** 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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**053-0001**) and click the **Search** button.
5. At the next screen, select the following information:
Geography: choose **Canada**
Estimates: choose **Births**
6. 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: Quarter 1 1946** and **To: the most recent date (Quarterly data)**
7. Choose **Retrieve as individual Time Series**.
8. 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 scatterplot (choose **Scatter graph**)
9. Click the **Manipulate data** button at the bottom of the screen to indicate we want to change the frequency of the output. On the next screen, change **the frequency of the output data** to **Annual (sum)**.
10. Leave all other options as they are.
11. Click the **Retrieve now** button to view your data in the format requested.
12. 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.
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.

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 scatterplots 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 scatterplots 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.
scatterplot	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.gc.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

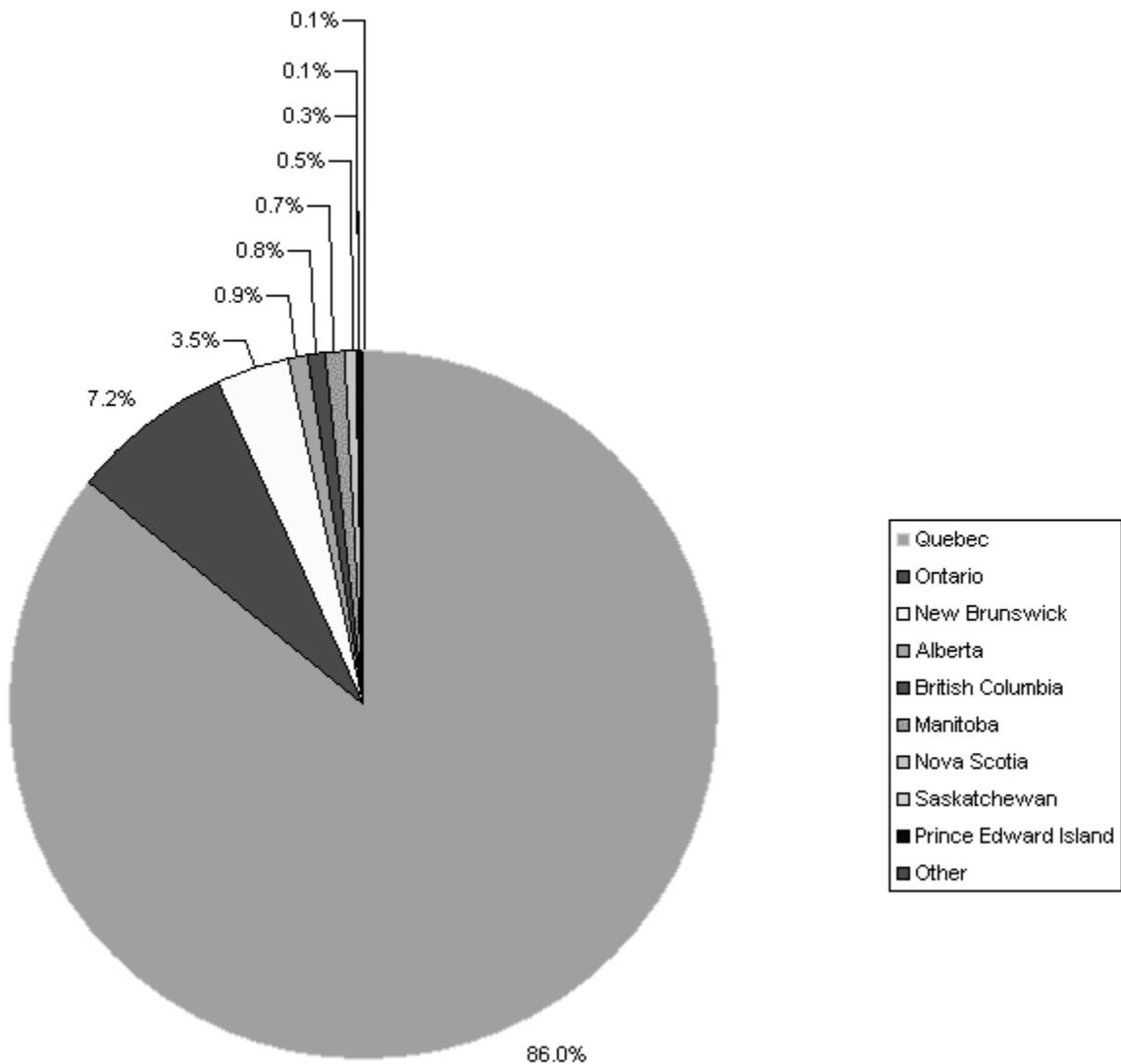
Dataset 1:

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.gc.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.gc.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

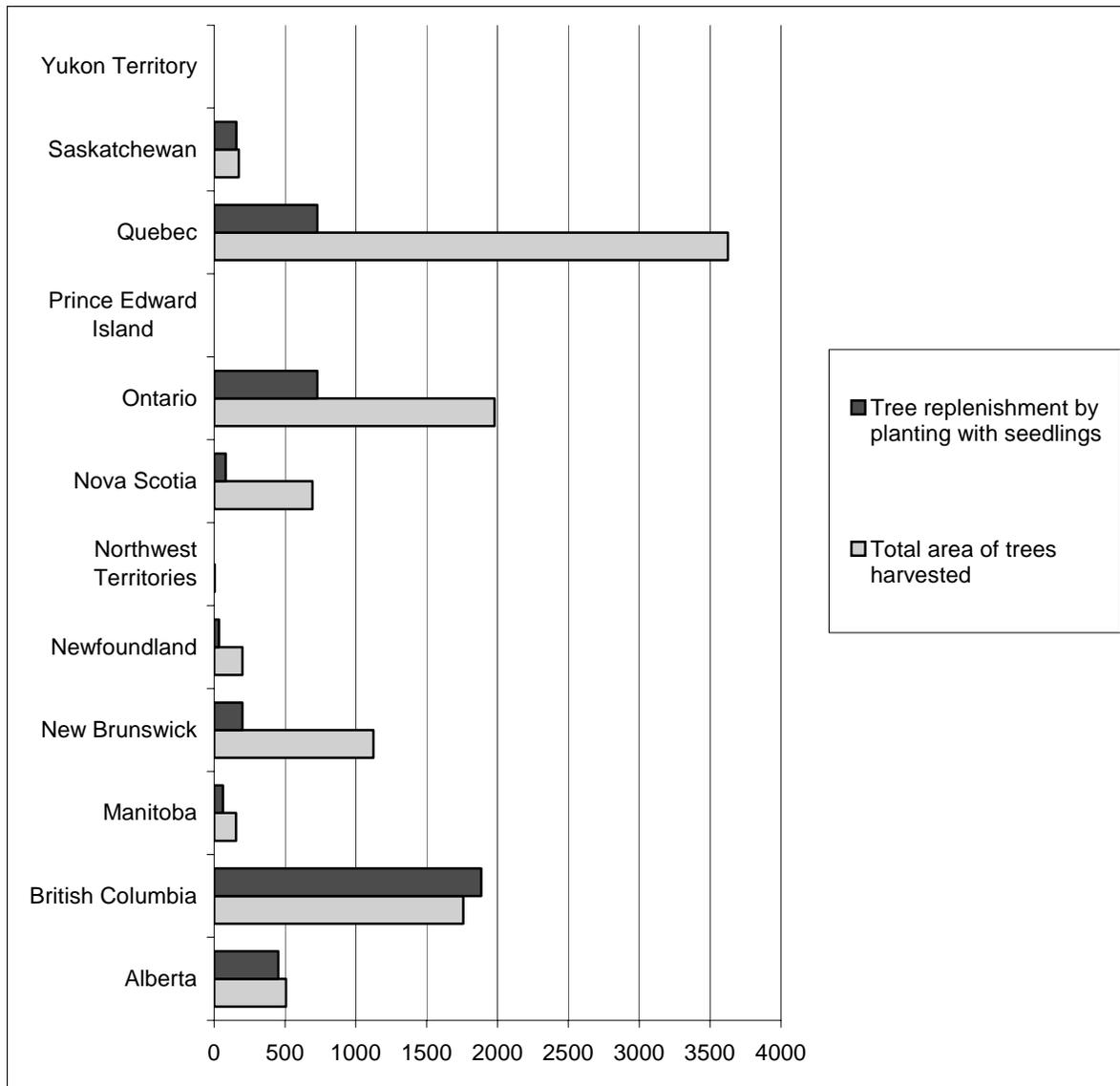
Dataset 2:

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.gc.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.gc.ca/>, extracted March 25, CANSIM, Table 104-0008 on E-STAT

Symbol legend: 2004
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.

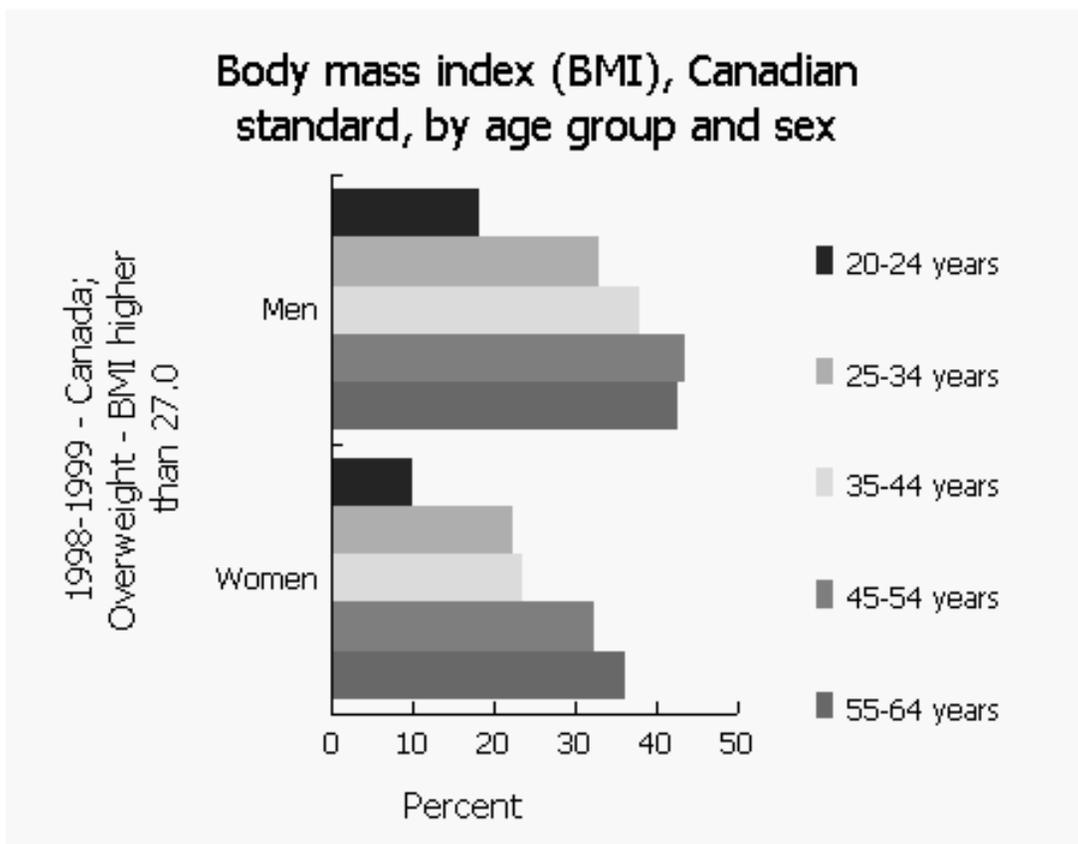
Lesson 4: Datasets – Teacher Notes

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.gc.ca/>, extracted March 25, 2004
CANSIM, Table 104-0008 on E-STAT

Lesson 4: Datasets

Dataset 4: Population of Counties in Nova Scotia from the 2001 Census, excluding Halifax and Cape Breton counties

Area Name:	Population, 2001
Nova Scotia - Annapolis County	21,773
Nova Scotia - Antigonish County	19,578
Nova Scotia - Colchester County	49,307
Nova Scotia - Cumberland County	32,605
Nova Scotia - Digby County	19,548
Nova Scotia - Guysborough County	9,827
Nova Scotia - Hants County	40,513
Nova Scotia - Inverness County	19,937
Nova Scotia - Kings County	58,866
Nova Scotia - Lunenburg County	47,591
Nova Scotia - Pictou County	46,965
Nova Scotia - Queens County	11,723
Nova Scotia - Richmond County	10,225
Nova Scotia - Shelburne County	16,231
Nova Scotia - Victoria County	7,962
Nova Scotia - Yarmouth County	26,843

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

Census Table: 2001, Population of Counties in Nova Scotia, excluding Halifax and Cape Breton counties

E-STAT database for schools

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

Profile: 2001 Population and Dwelling counts

Geography: N.S. (18 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 scatterplots
- 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.gc.ca>. This is found by clicking **The Daily** on the left side bar.
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 scatterplot for your data. Describe the correlation of the relationship between your variables.
3. Use the scatterplot you have created to consider the following:
 - a) On a hard copy of your scatterplot, 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.gc.ca/daily-quotidien/030925/dq030925e-eng.htm>
- *Daily* article: <http://www.statcan.gc.ca/daily-quotidien/010313/dq010313a-eng.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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**051-0005**) and click **Search**.
5. For **Geography**, choose **Canada**.
6. 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: Quarter 1 1946** and **To: the most recent date (Quarterly data)**
7. Choose **Retrieve as individual Time Series**.
8. 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 scatterplot (choose **Scatter graph**)
9. Click the **Manipulate data** button at the bottom of the screen to indicate we want to change the frequency of the output. On the next screen, change **the frequency of the output data** to **Annual (average)**.
10. Click **Retrieve now** to view your data in the format requested.
11. 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

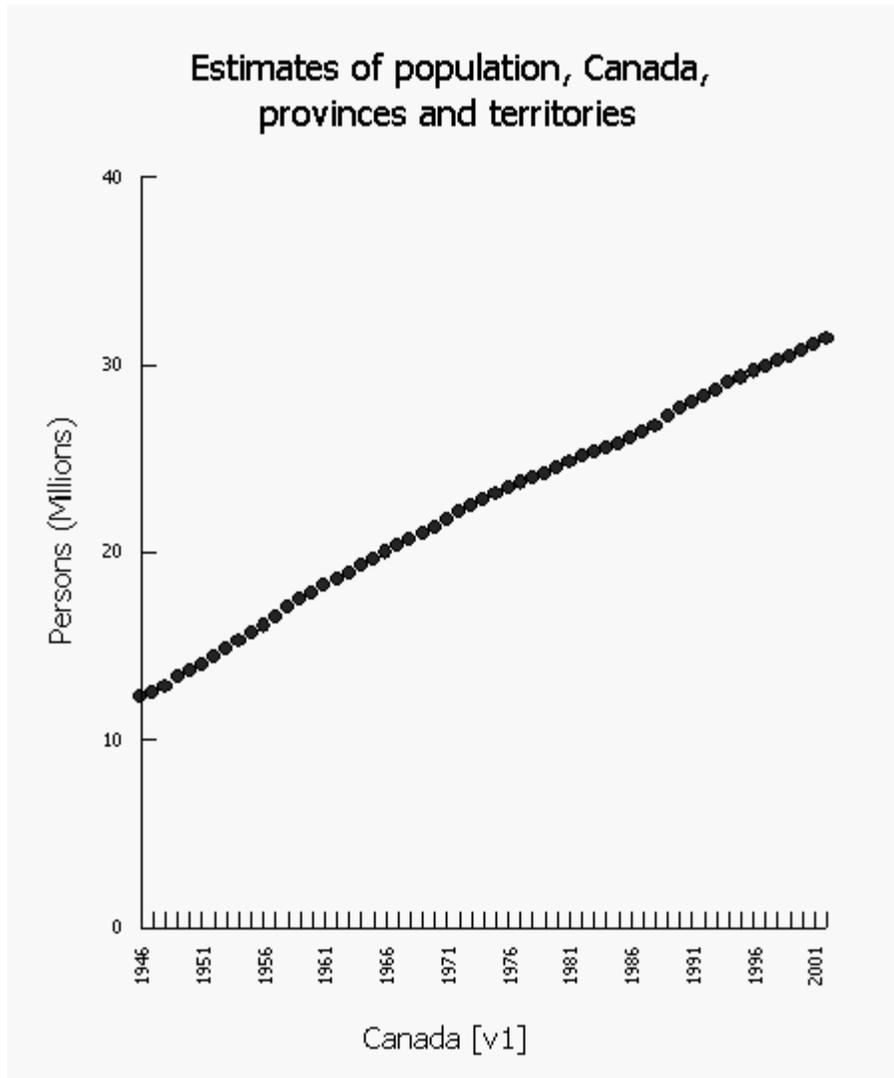
Computed annual average	Estimates of population, Canada, provinces and territories; (Persons)	Computed annual average	Estimates of population, Canada, provinces and territories; (Persons)
1946	12,284,500	1975	23,101,938
1947	12,544,750	1976	23,414,220
1948	12,816,250	1977	23,694,351
1949	13,355,000	1978	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.gc.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.gc.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 Nova Scotia consumed more potatoes in 1908 than they do now.

Related articles from the Statistics Canada website:

- *Daily* article: <http://www.statcan.gc.ca/daily-quotidien/030117/dq030117d-eng.htm>
- Canadian potato production - Updates <http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?lang=eng&catno=22-008-X>

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 5 years? Explain.

Instructions for accessing data:

Data for the Nova Scotia 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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**001-0014**) and click **Search**.
5. At the next screen, select Nova Scotia for Geography and Seeded area, potatoes (acres) in the Area, production and farm value of potatoes list.
6. 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** and **To: the most recent date (Annual data)**
7. Choose **Retrieve as individual Time Series**.
8. 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 scatterplot (choose **Scatter graph**).
9. Leave all other options as they are.
10. Click **Retrieve now** to view your data in the format requested.

Agriculture Project

Table: Acres seeded with potatoes, NS

Year	Acres seeded with potatoes
1908	43,800
1909	43,900
1910	30,800
1911	30,800
1912	32,000
1913	32,000
1914	32,500
1915	33,700
1916	34,500
1917	41,000
1918	51,200
1919	62,100
1920	50,100
1921	39,200
1922	38,100
1923	27,600
1924	29,100
1925	27,900
1926	29,500
1927	31,600
1928	30,700
1929	30,800
1930	31,200
1931	22,700
1932	20,600
1933	20,500
1934	21,900
1935	20,600
1936	20,600
1937	22,000
1938	21,200
1939	21,400

Year	Acres seeded with potatoes
1940	22,900
1941	18,600
1942	20,500
1943	22,100
1944	21,400
1945	18,400
1946	17,900
1947	15,600
1948	14,700
1949	13,800
1950	13,400
1951	11,300
1952	12,000
1953	12,400
1954	10,800
1955	11,800
1956	10,200
1957	10,000
1958	9,800
1959	8,600
1960	8,000
1961	8,100
1962	6,400
1963	6,200
1964	5,800
1965	5,800
1966	6,200
1967	4,900
1968	5,000
1969	4,300
1970	4,500
1971	3,500

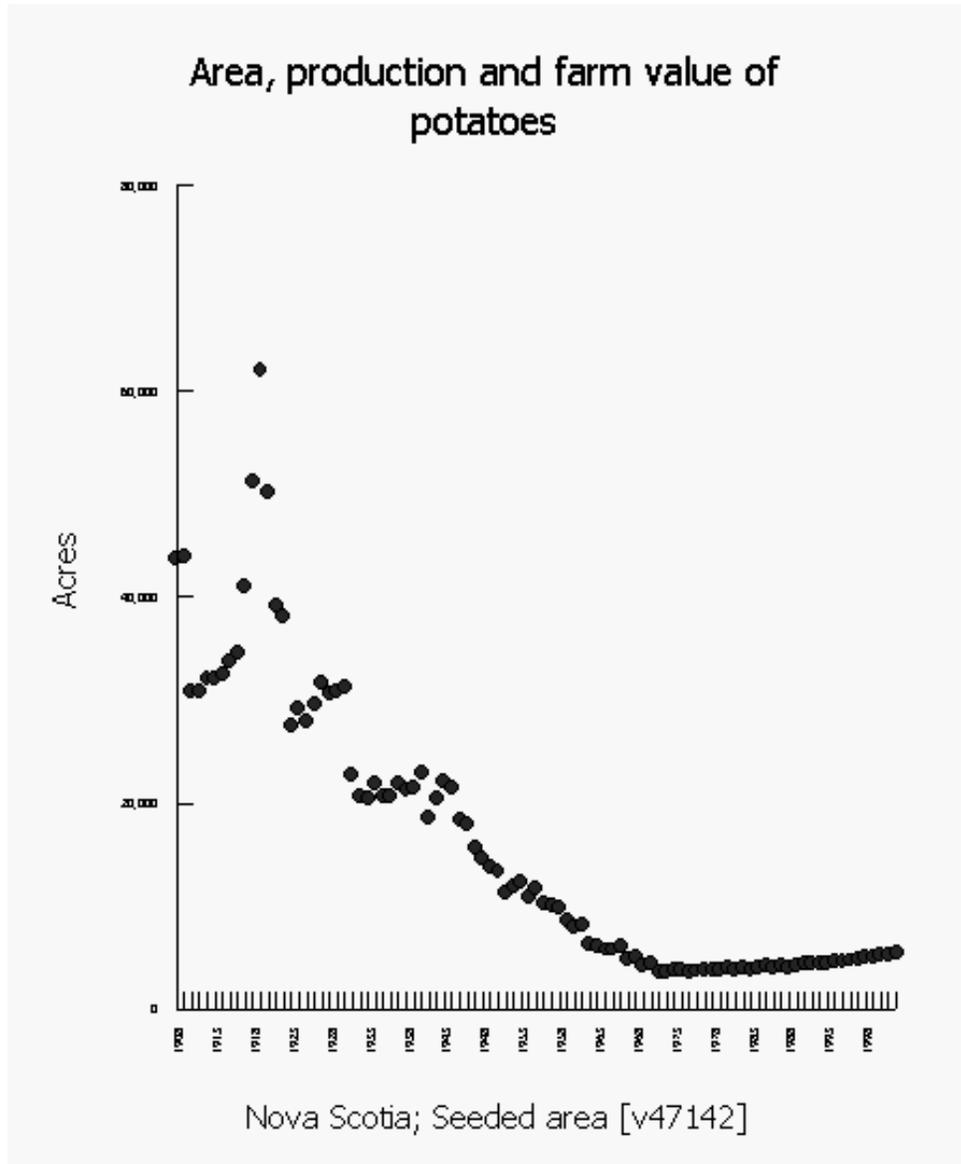
Year	Acres seeded with potatoes
1972	3,500
1973	3,800
1974	3,900
1975	3,600
1976	3,700
1977	3,800
1978	3,800
1979	3,900
1980	4,000
1981	3,800
1982	4,000
1983	3,900
1984	4,100
1985	4,200
1986	4,033
1987	4,200
1988	4,100
1989	4,300
1990	4,500
1991	4,400
1992	4,500
1993	4,500
1994	4,600
1995	4,700
1996	4,750
1997	4,800
1998	5,000
1999	5,100
2000	5,200
2001	5,200
2002	5,500

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

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

Teacher Notes: Population Growth Project

Sample Graph: Acres seeded with potatoes, NS



Source: Statistics Canada, <http://www.statcan.gc.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: Nova Scotia

Estimates: Seeded area (acres)

Time: 1908 to 2002

Lesson 5 Project 3: Electrician Wage Project

Statement for analysis: Halifax electricians need a raise

Related articles from the Statistics Canada website:

- Daily article: <http://www.statcan.gc.ca/daily-quotidien/021021/dq021021h-eng.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 the current year, and the wage changes from 1971 to 1985? Explain your findings.

What would you expect electrician's wages to be two years from now? 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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**327-0003**) and click **Search**.
5. At the next screen, select the following information:
Geography: choose Halifax, Nova Scotia
Construction Trades: choose Electrician
Type of wage rates: choose Basic construction union wage rates. Dollars per hour
6. 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** and **To: the most recent date (Monthly data)**
7. Choose Retrieve as individual Time Series.
8. 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 scatterplot (choose **Scatter graph**)
9. Click the **Manipulate data** button at the bottom of the screen to indicate we want to change the frequency of the output. On the next screen, change **the frequency of the output data** to **Annual (average)**.
10. Click **Retrieve now** to view your data in the format requested.

Electrician Wage Project

Table: Construction union wage rates, electricians, NS

Year	Computed annual average
1971	4.92
1972	5.36
1973	5.79
1974	6.47
1975	7.02
1976	7.82
1977	8.72
1978	9.16
1979	10.43
1980	10.93
1981	12.25
1982	13.34
1983	14.04
1984	16.04
1985	17.99
1986	19.02

Year	Computed annual average
1988	20.13
1989	20.59
1990	21.28
1991	21.97
1992	22.20
1993	22.32
1994	22.67
1995	22.67
1996	22.67
1997	22.59
1998	22.53
1999	22.53
2000	22.53
2001	22.70
2002	23.22

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

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

Survey or program details:

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

Geography: Halifax, Nova Scotia

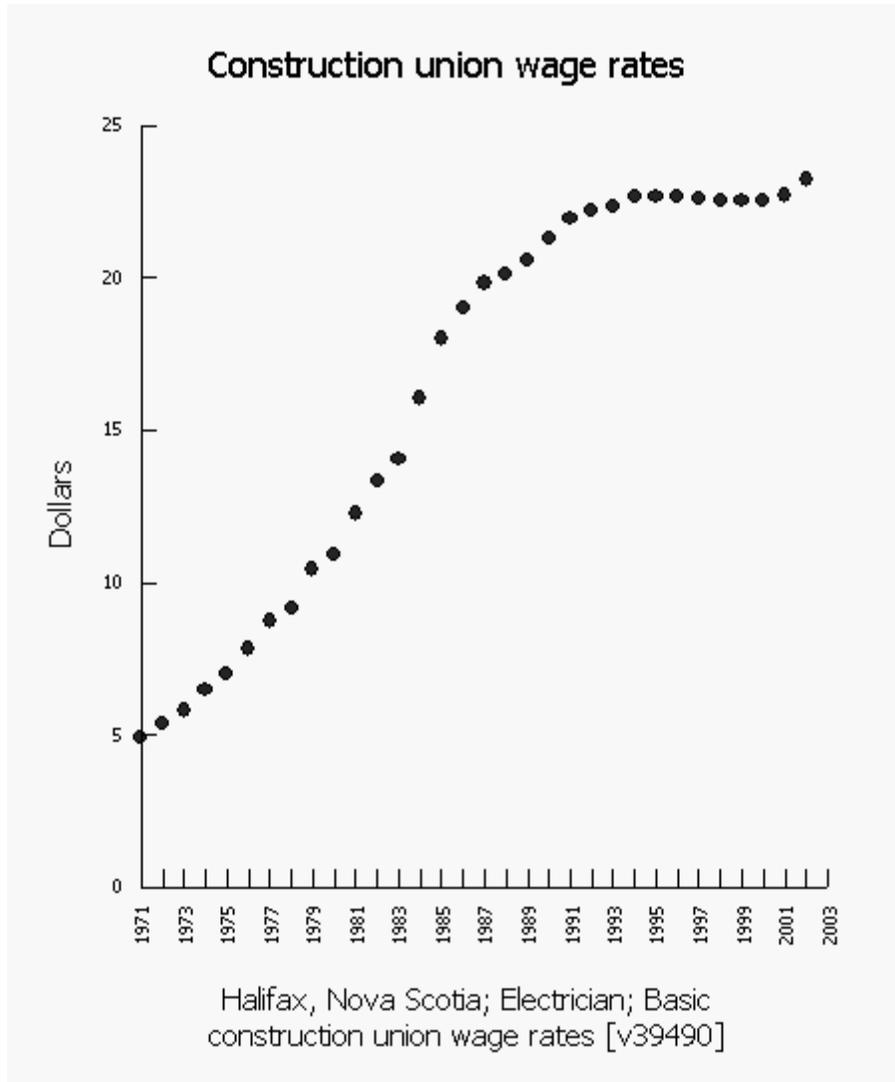
Construction trades: Electrician

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, NS



Source: Statistics Canada, <http://www.statcan.gc.ca/>, extracted March 25, 2004
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.gc.ca/subjects-sujets/cpi-ipc/cpi-ipc-eng.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 the coming year? 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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**326-0021**) and click **Search**.
5. At the next screen, select the following information:
Geography: choose Halifax, Nova Scotia
Commodities and commodity groups: All-items
6. 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** and **To: the most recent date (Annual data)**
7. Choose **Retrieve as individual Time Series**.
8. 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 scatterplot (choose **Scatter graph**)
9. Change the **frequency of the output data** to **converted to annual (average)**.
10. Leave all other options as they are.
11. Click **Retrieve now** to view your data in the format requested.

Consumer Price Index Project

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

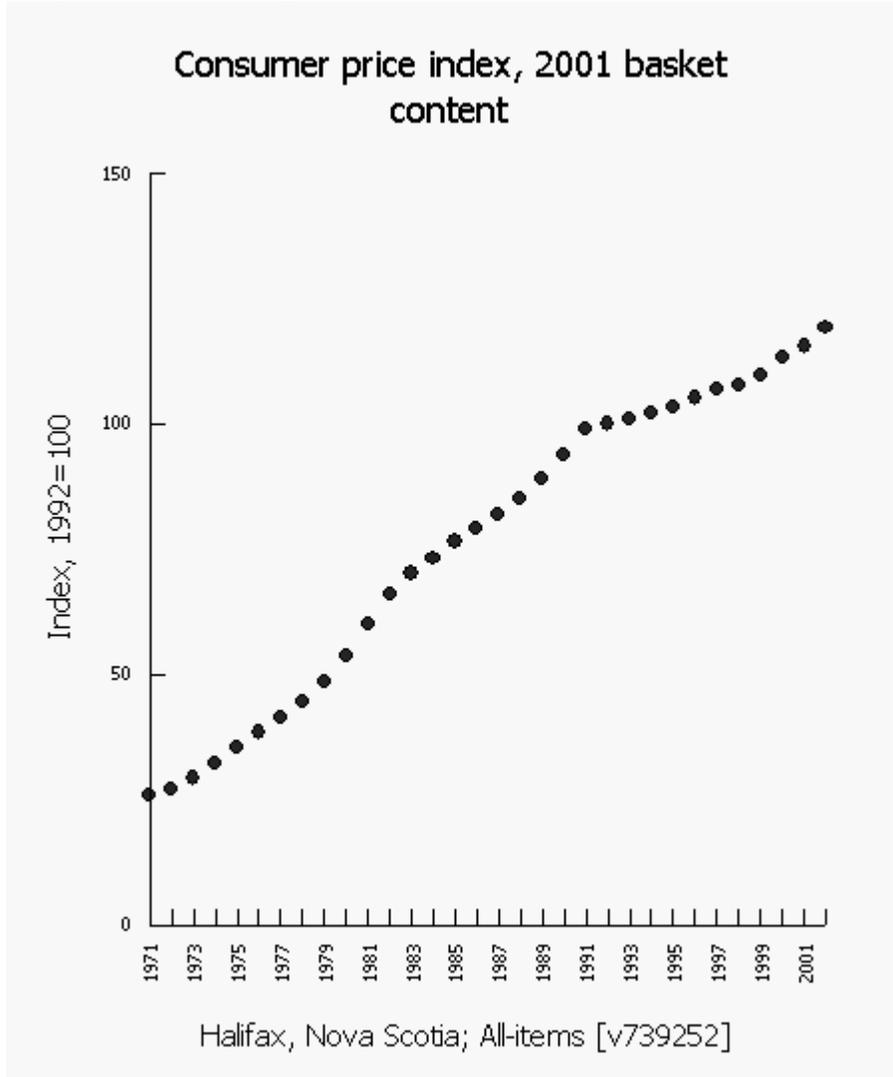
Computed annual average	Consumer price index, Halifax, NS, all items
1971	25.9
1972	27.2
1973	29.3
1974	32.2
1975	35.5
1976	38.5
1977	41.4
1978	44.6
1979	48.6
1980	53.8
1981	60.2
1982	65.9
1983	70.2
1984	73.3
1985	76.6
1986	79.2
1987	82.0
1988	85.1
1989	89.1
1990	93.7
1991	99.1
1992	100.0
1993	101.0
1994	102.1
1995	103.4
1996	105.1
1997	107.1
1998	107.9
1999	109.8
2000	113.2
2001	115.5
2002	119.1

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

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

Teacher Notes: Consumer Price Index Project

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



Source: Statistics Canada, <http://www.statcan.gc.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: Halifax, Nova Scotia

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: Halifax, Nova Scotia

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.gc.ca/daily-quotidien/020821/dq020821b-eng.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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**326-0021**) and click **Search**.
5. At the next screen, select the following information:
Geography: choose Nova Scotia
Commodities and commodity groups: choose Education: Tuition Fees
6. 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** and **To: the most recent date (Annual data)**
7. Choose Retrieve as individual Time Series.
8. 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 scatterplot (choose **Scatter graph**)
9. Leave all other options as they are.
10. Click **Retrieve now** to view your data in the format requested.

Tuition Project

Table: CPI (Consumer Price Index) for Tuition Fees (NS)

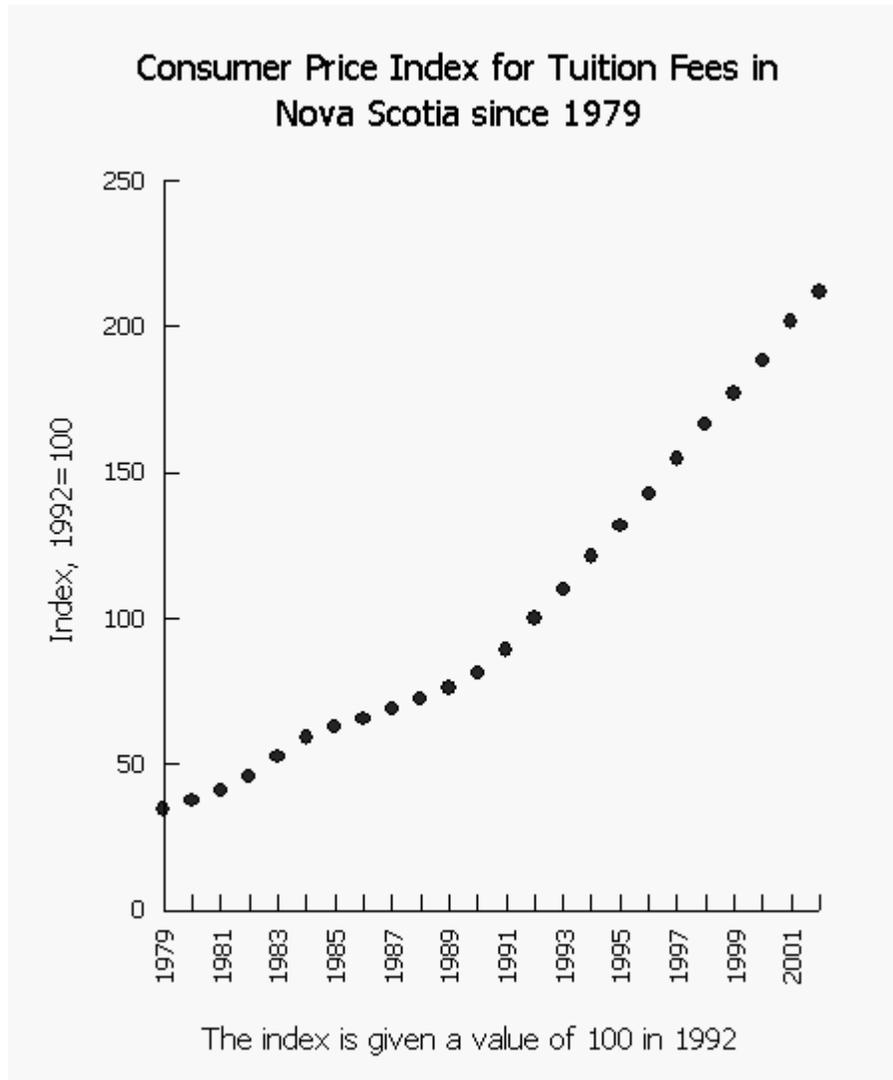
Year	Consumer price index, 2001 basket content; Nova Scotia; Tuition fees (Index, 1992=100)
1979	34.8
1980	37.8
1981	41.2
1982	46.1
1983	52.9
1984	59.2
1985	62.9
1986	65.9
1987	69.0
1988	72.3
1989	76.2
1990	81.5
1991	89.3
1992	100.0
1993	110.1
1994	121.1
1995	131.8
1996	142.5
1997	154.7
1998	166.5
1999	177.0
2000	188.3
2001	201.5
2002	211.9

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

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

Teacher Notes: Tuition Project

Sample Graph: CPI (Consumer Price Index) for Tuition Fees (NS)



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

Survey or program details:

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

Geography: Nova Scotia

Commodities and commodity groups: Tuition fees

Dates: 1979 to 2002

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.gc.ca/daily-quotidien/020912/dq020912a-eng.htm>

Series III questions:

Describe the trends that can be seen in this dataset.

How would you explain the operating revenue in 1988?

How would you explain the operating revenue in 2001?

What would you expect the operating revenue to be in two years? 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 in E-STAT** from the list on the left of the screen.
4. Type in the table number (**353-0001**) and click **Search**.
5. At the next screen, select the following information:
Geography: choose Canada
Operating and financial detail: choose Operating revenue, total
6. 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** and **To: the most recent date (Annual data)**
7. Choose **Retrieve as individual Time Series**.
8. 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 scatterplot (choose **Scatter graph**)
9. Leave all other options as they are.
10. Click **Retrieve now** to view your data in the format requested.
11. To see more recent data (after 2001) repeat the process from step 3 above using **Table 353-0003**.

Consumer Price Index Project

Table: Cable Television Industry

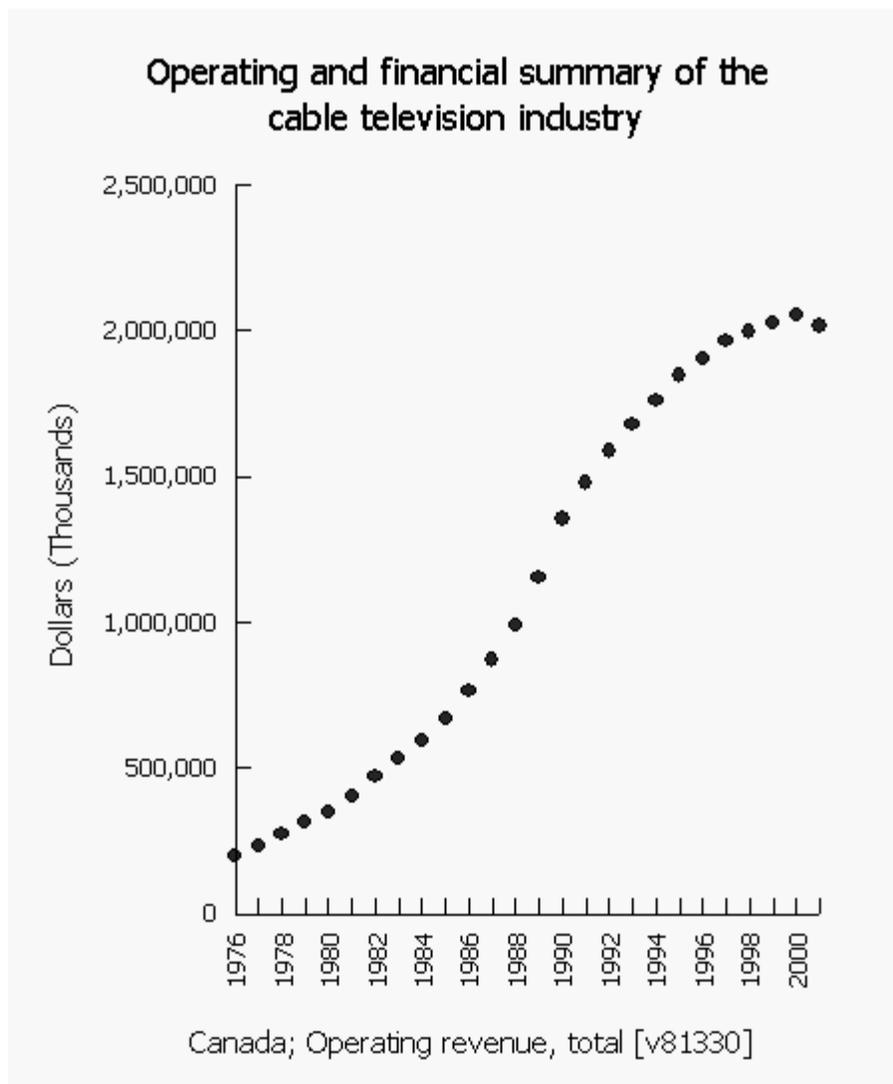
Annual	Operating and financial summary of the cable television industry; Canada; Operating revenue, total (Dollars - Thousands)
1976	199,250
1977	232,958
1978	273,223
1979	313,748
1980	352,171
1981	405,023
1982	472,344
1983	534,982
1984	595,057
1985	672,136
1986	767,039
1987	870,625
1988	989,509
1989	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.gc.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.gc.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.
 3. Choose **Search Censuses in E-STAT** from the list on the left of the screen.
 4. Under **Select a Census**, click the arrow to see all the choices. Choose **2006 Census** and click **Go!**
 5. **Database selection:** Select **2006 Census of Population (Provinces, Census Divisions, Municipalities)** and click **Go!**
 6. **Profile selection:** Click the arrow to see all the choices, and select **2006 Cumulative Profile**, and then click **Go!**
 7. At the next screen, make your choices based on your topic.
 8. At the top of the main selection page, select the **Geographic region** of interest, such as *2006 Provinces and Territories*, or *2006 - N.S. (18 counties)*.
 9. When choosing **Characteristics**, 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 top or bottom of the checklist and click the button: **Return to selection page**.
 10. At the bottom of the main selection page, choose the output format. Choose **HTML Table (Geography = Rows)** to produce a usable data table. You can also choose a graphic format, such as **Scatter Graph**, in order to draw a graph of the data. Click the **Retrieve now** button at the bottom of the page to generate the data output.
 11. To enhance or modify a graph click the **Modify Graphic** button 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 on scatter graphs**". This is useful when the two characteristics in the scatter graph have the same units, for example, estimates of female population and male population by age group in 2000.

Then click the **Redraw** button.
 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 using this page**, **Help/Frequently asked questions**, **User guides and lesson plans**, 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.
 3. Choose **Search CANSIM in E-STAT** from the list on the left of the screen.
 4. You have several choices for finding information about your topic:
 - a. Enter the table number or specific key words for your topic. Click **Search** to search for this data.
 - b. Click **CANSIM by subject** from the menu list on the right, or **CANSIM by survey** at the top right of the search page. Narrow down to the information you require through the choices offered.
 5. When you have selected your table, you will need to make other choices based on your topic.
 6. When choosing characteristics from one of the dimensions, click on the **View checklist and footnotes** 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 pick list**.
 7. 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.
 8. Choose **Retrieve as individual Time Series**.
 9. At the next screen, go to the **Output format selection** and choose your format. Choose **HTML table: Time as rows** to produce a usable data table. Choose a graphic format, such as **Scatter graph**, in order to draw a graph of your data. E-STAT can output the data as many different types of graph (currently 15 different graph types).
 10. If the data are provided with a quarterly or monthly frequency, you can change this to annual data by choosing one of the **frequency conversion options**, such as **Annual (average)**. This is found by clicking on **Manipulate data** button at the bottom of the Output specification page.
 11. Click the **Retrieve now** button at the bottom of the page to view your data in the format requested.
 12. 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**" or not, 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). This option is the default.
 - you may choose "**Equally scaled axes on 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**.
 13. 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 using this page**, **Help/Frequently asked questions**, **User guides and lesson plans**, 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>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>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>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>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>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>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>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>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>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>BOC 9.3 (relates to 6.3) demonstrate comfort with keyboarding and manipulation of computer input and peripheral devices as they work</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>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>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 9.3 (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>BOC 9.4 (relates to 6.4) manage their electronic files and correspondence efficiently</p>	<p>SEHI 9.4 (relates to 6.2, 6.7, 6.8) demonstrate an understanding of, and a commitment to, accuracy, ethical behaviour, and personal privacy and safety as they create and distribute information about themselves, others, and curriculum topics under study</p>	<p>PTS 9.4 (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>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 teacher guidance</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 technicians</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>