Population and Productivity: Two P’s in a Pod

Students will investigate the link between countries’ population growth rates and levels of industrialization.

Grade Level
Grades 6–8

Time Required
120 minutes

Curriculum Connection
Prince Edward Island, Grades 6–8 Social Studies

Link to Canadian National Geography Standards

Essential Element #2 (Grades 6–8) – Places and regions
- Factors that influence people’s perception of places and regions
- Changes in places and regions over time

Essential Element #4 (Grades 6–8) – Human systems
- Population density, distribution, and growth rates
- Demographic transition of a country
- Patterns of culture in Canada and the world (e.g. religion, language, ethnicity, economy)
- Regional development in Canada and the world

Essential Element #5 (Grades 6–8) – Environment and Society
- Effects of human modification of the physical environment (e.g. global warming, deforestation, desertification, urbanization)

Geographic Skills #1 (Grades 6–8) – Asking Geographic Questions
- Identify geographic issues, define geographic problems, and pose geographic questions
- Plan how to answer geographic questions

Geographic Skills #2 (Grades 6–8) – Acquiring Geographic Information
- Use a variety of research skills to locate and collect geographic data
- Use maps to collect and/or compile geographic information

Geographic Skills #3 (Grades 6–8) – Organizing Geographic Information
- Prepare various forms of graphs to organize and display geographic information
- Prepare various forms of diagrams, tables, and charts to organize and display geographic information
**Geographic Skills #4 (Grades 6–8) – Analysing Geographic Information**
- Interpret and synthesize information obtained from a variety of sources: graphs, charts, tables, diagrams, texts, photographs, documents, and interviews

**Geographic Skills #5 (Grades 6–8) – Answering Geographic Questions**
- Develop and present combinations of geographic information to answer geographic questions

**Canadian Geographic–CIDA Map**
This lesson uses the Canadian Geographic–CIDA map *A Developing World*. Copies of the map have been distributed to schools across Canada. To view an on-line version of the map, please go to [www.canadiangeographic.ca/worldmap](http://www.canadiangeographic.ca/worldmap).

**Additional Resources, Materials, and Equipment Required**
- Computer lab with Internet access to the following websites:
  - [www.prb.org/datafinder.aspx](http://www.prb.org/datafinder.aspx)
  - [www.uwm.edu/geography/demotrans/demtran.htm](http://www.uwm.edu/geography/demotrans/demtran.htm)

**Main Objective**
Students will see the relationship between a country’s level of industrialization and its population growth rate. They will also observe that, over time, as a country becomes more industrialized, its population growth rate decreases.

**Learning Outcomes**
By the end of the lesson, students will be able to:
- understand the relationship between a country’s level of industrialization and its population growth rate;
- better understand population distribution in the world; and
- understand what demographic transition is, and give an example of it.
Lesson

Introduction

- In one year, one person in the village will die, but in the same year, two babies will be born. At the year’s end, the number of villagers will be 101.
  - These statistics can be found at:
    - www.familycare.org/news/if_the_world.htm
  - You may also have students (individually, in pairs, or as a class) make guesses as to the numbers on the graphs under the population section of the map A Developing World. This may be done by blanking out the place names on the pie chart and having students place areas with the amount they think is correct. With the bar graph, blank out the values, and have them make guesses as to what percentage of each region’s population is under the age of 15.
  - Ask students to imagine if the total population of the world was just 100 people.
  - Ask students to make guesses as to the number of people (out of 100) that would fall into each of the statistical categories (Note: the statistics change slightly over time, but these figures accurately reflect general patterns worldwide.) The statistics are as the following.

If 100 people lived in this global village:
- 51 would be women, 49 would be men
- 30 would be children, 70 would be adults
- seven would be older adults
- 90 would be heterosexual, 10 would be homosexual
- 70 would be non-white, 30 would be white
- 60 would be Asian, 14 would be African, 13 would be from North and South America, 12 would be Europeans, and the remaining one would be from the South Pacific
- 33 would be Christians, 19 would be believers in Islam, 13 would be Hindus, six would follow Buddhist teachings, five would believe that there are spirits in the trees and rocks and in all of nature, and 24 would believe in other religions, or would believe in no religion
- 17 would speak Chinese, nine would speak English, eight would speak Hindi and Urdu, six would speak Spanish, six would speak Russian, and four would speak Arabic
- That would account for half the village. The other half would speak Bengal, Portuguese, Indonesian, Japanese, German, French, or some other language.
- In such a village with so many different people, it would be very important to learn to understand those who are different and to accept others as they are.
- But consider this: of the 100 people in this village,
- 20 are undernourished, and one is dying of starvation, while 15 are overweight
- In this village, six people own 59 percent of the wealth (all of them live in the United States), 74 people own 39 percent, and 20 people share the remaining 2 percent.
- In this village, 20 people consume 80 percent of the energy, and 80 people share the remaining 20 percent.
- 75 people have some supply of food and a place to shelter them from the wind and the rain, but 25 do not
- 17 people have no clean, safe water to drink
- If you have money in the bank, money in your wallet, and spare change somewhere around the house, then you are among the eight richest people.
- If you have a car, you are among the seven richest people.
- Among the villagers, one has a college education, two have computers, and 14 cannot read.
- If you can speak and act according to your faith and your conscience without harassment, imprisonment, torture, or death, then you are more fortunate than 48 others who cannot.
- If you do not live in fear of death by bombardment, armed attack, landmines; or of rape or kidnapping by armed groups, then you are more fortunate than 20 people, who do.

- In one year, one person in the village will die, but in the same year, two babies will be born. At the year's end, the number of villagers will be 101.
  - These statistics can be found at:  
    - [www.familycare.org/news/if_the_world.htm](http://www.familycare.org/news/if_the_world.htm)
  - You may also have students (individually, in pairs, or as a class) make guesses as to the numbers on the graphs under the population section of the map *A Developing World*. This may be done by blanking out the place names on the pie chart and having students place areas with the amount they think is correct. With the bar graph, blank out the values, and have them make guesses as to what percentage of each region’s population is under the age of 15.

**Lesson Development**

- Explain that most people in the world live very different lives from their own, and that most people are not as fortunate as they are.
- Inform the class that they will now focus on the economic side of things. Have students, alone, or in pairs, investigate at least 10 countries (or more, if time permits) on the following website:  
  - [http://www.prb.org/datafinder.aspx](http://www.prb.org/datafinder.aspx)
- Have each student or pair of students look up each country’s birth rate and death rate per 1,000 people. Ask students to calculate the crude net population increase (whether negative or positive) by subtracting the death rate from the birth rate.
- Once students have done this, ask them to find the GDP per capita in US$ PPP on the map *A Developing World* for each country that they have chosen.
- Ask the students to create a scatter plot / line graph. They should place population increase on the vertical (Y axis), and the countries’ GDP values on the horizontal (X axis). If they notice any relationships, they should write them down.
**Conclusion**

- Ask students if they came to any conclusions concerning the relationships between these numbers.
- In order to provide a clear visual representation for the entire class to see, create a blank graph similar to the ones the students have made. Plot the values for several countries, so the class can see their results along with the other results. If any students do not see the relationship this time, explain the theory behind it.
- Students should be able to see the relationship between a country’s economic development and its population growth when these are graphed as dots or as a line. (The lower a country’s level of industrialization or development, the greater the rate at which its population increases.) As a country increases its level of industrialization or development over time, its population growth rate decreases. Explain that this is called demographic transition.

**Assessment of Student Learning**

- Data and graphs may be collected for grading with the attached rubric.
- Give students a few questions to be answered with their own graph, to check for their level of understanding. For example:
  a) Pick one of your 10 countries. Do you think this country’s population will increase or decrease in the next 50 years? Explain your answer.
  b) What relationship do you notice between a country’s GDP and its population growth rate? Will a country with a high GDP value have a high population growth rate, a low population growth rate, or a decrease in population? Give examples from the graph to support your answers.
  c) In your own words, define demographic transition.
  d) In what kinds of areas in the world is population increasing faster?
## Rubric

<table>
<thead>
<tr>
<th>Category</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neatness and Attractiveness</td>
<td>Exceptionally well designed, neat, and attractive. Colours that go well together are used to make the graph more readable. A ruler and graph paper (or graphing computer program) are used.</td>
<td>Neat and relatively attractive. A ruler and graph paper (or graphing computer program) are used to make the graph more readable.</td>
<td>Lines are neatly drawn but the graph appears quite plain.</td>
<td>Appears messy and “thrown together” in a hurry. Lines are visibly crooked.</td>
</tr>
<tr>
<td>Accuracy of Plot</td>
<td>All points are plotted correctly and are easy to see. If lines are made, a ruler is used to neatly connect the points, if not using a computerized graphing program.</td>
<td>All points are plotted correctly and are easy to see.</td>
<td>All points are plotted correctly. Some points are not plain to see.</td>
<td>Points are not plotted correctly OR extra points are included.</td>
</tr>
<tr>
<td>Labelling of X Axis</td>
<td>The X axis has a clear, neat label that describes the units used for the independent variable (country’s GDP dollar amounts).</td>
<td>The X axis has a clear label that describes the units used for the independent variable.</td>
<td>The X axis has a label.</td>
<td>The X axis is not labelled.</td>
</tr>
<tr>
<td>Labelling of Y Axis</td>
<td>The Y axis has a clear, neat label that describes the units and the dependent variable (population increase per 1,000 people).</td>
<td>The Y axis has a clear label that describes the units and the dependent variable.</td>
<td>The Y axis has a label.</td>
<td>The Y axis is not labelled.</td>
</tr>
<tr>
<td>Data Table</td>
<td>Data in the table are well organized, accurate, and easy to read.</td>
<td>Data in the table are organized, accurate, and easy to read.</td>
<td>Data in the table are accurate and easy to read.</td>
<td>Data in the table are not accurate and/or cannot be read.</td>
</tr>
</tbody>
</table>