

## Chapter 5: Google Earth Exercise

### Exercise 1

#### Visualizing the Population Change: Births, Deaths, Infant Mortality, and AIDS

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The relationship between mortality, birth rates, and AIDS is well described in the textbook. In this exercise we will examine the patterns of these indicators on a global scale.

**The task:** Using Google Earth, examine the choropleth maps of crude death rate (CDR), crude birth rate (CBR), infant mortality, and the prevalence of AIDS. The interaction of these maps can provide clues as to what factors impact these variables.

**Step 1:** Disable all layers in Google Earth, except for “Borders and Labels.” Load the [Chapter 5.kmz](#) file that contains the following layers derived from 2010 World Bank data:

- AIDS Prevalence per 1000 (inhabitants aged 15–49)
- Infant Mortality per 1000 births (infants dying before reaching one year of age)
- CDR (crude death rate per 1000 population)
- CBR (crude birth rate per 1000 population)

Note: clicking on any country while the above layers are enabled will indicate the exact statistic for that layer. For CDR and CBR decadal averages are presented as well as the value from 2010.

**Step 2:** Begin by alternating between the CDR and CBR layers. Your textbook notes that high mortality and high birth rates are often linked to poverty and are prevalent in less developed countries. Refer to figure 5.12 in your text.

- **Question 1:** Which countries in Africa exhibit a ratio of CDR to CBR that suggests a high rate of natural increase? What is the historical trend for both indicators in these countries? At what stage of the demographic transition model are these countries (Figure 5.12 in the textbook)?
- **Question 2:** Shift your attention to Europe. What broad continental trend is evident in CDR and CBR? Provide some examples of European countries experiencing negative population growth.

**Step 3:** Use the search box to locate Botswana on the map. Examine all four layers for this country, and compare values to surrounding countries.

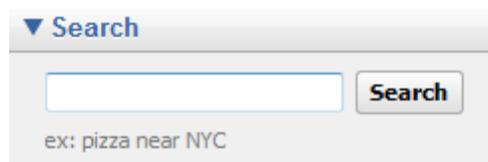


Figure 1: Search box

- **Question 3:** What do the data suggest about Botswana’s demographics? Compare the CBR and CDR data from the 1980’s and 1990’s and explain the differences? Refer to all four data layers.

## Exercise 2

### Population dynamics: Growth, structure, and migration

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This exercise uses world population data to examine patterns, interactions, and differences in population growth, migration, age, and sex structures at world, continental, and country scales.

**The task:** Using Google Earth, examine the choropleth maps of the following population characteristics. By examining patterns both within and among these maps we can visualize interactions among population characteristics and consider some of the social and economic implications that arise from variations in population structures.

**Step 1:** Disable all layers in Google Earth, except for “Borders and Labels.” Load the [Chapter 5.2.kmz](#) file that contains the following layers derived from 2008 CIA data.

- Population growth rate (The average annual percent change in the population, resulting from a surplus (or deficit) of births over deaths and the balance of migrants entering and leaving a country)
- Percent of population aged 65 years and older
- Percent of population aged 0–14 years
- Net migration rates (number of migrants per 1000 population)
- Sex ratio male/female at birth (number of males to females born)

Note: clicking on any country while the above layers are enabled will indicate the exact statistic for that layer.

**Step 2:** Enable the “Population growth rate” layer.

- **Question 1:** What broad continental trends are evident across the globe? Where are population growth rates the highest? Where are they the lowest?

**Step 3:** Enable the layer titled “Percent of population aged 65 years and older” and scan Google Earth to visualize broad population trends.

- **Question 2:** Are the broad continental patterns similar to or different from population growth rate trends?

**Step 4:** Repeat Step 3 above, this time enabling the layer titled “Percent of population aged 0–14 years.”

- **Question 3:** Are the broad continental patterns similar to or different from population growth rate trends?

**Step 5:** Return to the “Population growth rate” layer and compare this layer with the layer titled “Net migration rates.”

- **Question 4:** Why do countries such as Canada have such high rates of migration yet relatively low rates of population growth? Conversely, why do countries such as Haiti have such high rates of population growth despite negative rates of migration?

Differences in population are expressed not only in growth and age, but also in sex ratios. As your textbook notes, at the world scale, there are about 101 males for every 100 females, and in most parts of the world about 104–108 males are born for every 100 females.

**Step 6:** Enable the layer titled “Sex ratio male/female at birth.” As is evident from the data, there are significant differences in sex ratios around the world. Refer to Box 5.4 in your text and page 148 to help answer the following questions:

- **Question 5:** What patterns are evident? What are some of the causes and social implications of such a skewed ratio of males to females?

## Answers

### Exercise 1

- **Question 1:** Examples include Libya and Egypt. Both have experienced a dramatic reduction in CDR and a smaller, but significant reduction in birth rates. This suggests a stabilizing population and a Stage 3 classification in the demographic transition model.
- **Question 2:** There is a relative uniformity of birth rates, but mortality increases dramatically in a west to east gradient. Most countries of the former Soviet Union are experiencing high mortality and low birth rates—Russia, Belarus, Ukraine, Lithuania, Moldova, Latvia and several others have death rates that exceed birth rates.
- **Question 3:** Botswana's crude death rate was considerably lower in the 1980s and 1990s. It has risen since and the data suggest that AIDS crisis is a factor. Infant mortality is low for the region, but the prevalence of AIDS is very high, suggesting that mortality is linked to adults succumbing to the disease.

### Exercise 2

- **Question 1:** Population growth rates are highest in Africa and South Asia and lowest in Eastern Europe and Russia.
- **Question 2:** Generally they are inversely related. Countries and continents with high population growth rates tend to have a smaller share of the population aged 65 years and older. Countries and continents with low population growth rates tend to have a greater percentage of the population aged 65 years and older.
- **Question 3:** Comparing population growth rates to population aged 0–14 shows a positive correlation. Countries and continents with high population growth rates tend to have a larger share of the population between 0–14 years. Countries and continents with low population growth rates tend to have a lower percentage of the population aged 0–14 years.
- **Question 4:** Canada's high net migration rate and low population change rate suggests that the country's Rate of Natural Increase (RNI) is quite low. The majority of population growth comes from immigration. Conversely, in Haiti, the high rate of population change and negative rate of migration suggests that its RNI is quite high. The majority of population growth is due to high birth rates.
- **Question 5:** Countries in South, East and Central Asia appear to have the highest ratios of males to females. Causes of sex ratio imbalances can result from government policies (such as China's one-child policy), social conventions (such as the dowry system in India), and a broad cultural preference for sons rather than daughters. Some social implications that can result include an increase in sexual trafficking of women and girls, a lack of female partners for males, and higher rates of mental illness and suicide in women and girls.