Measuring and Assessing Population Change

Use Counterpoints p. 362-367 to help complete the worksheet.

Vocab:

Crude birth rate - the number of live births in a year divided by the population x 1000. Most often expressed as a percentage or as the number of live births per 1000 people: _____/1000 **Crude death rate** - the number of deaths in a year divided by the population x 1000. Most often expressed as a percentage or as the number of deaths per 1000 people: _____/1000 **Natural increase** - total deaths minus total births. "Rate of Natural Increase" is expressed as a

percentage, where you can simply subtract the death rate from the birth rate.

Infant mortality rate – the number of infants (less than 1 year of age) who die /1000.

U5 mortality rate – one of the main factors used by the UN when scoring human development; it is the number of children under 5 years old who die /1000.

Total fertility rate – the average number of children that would be born alive to a woman in her lifetime if she were to pass through her childbearing years (ages 14-49).

Exponential increase - 1, 2, 4, 8, 16..... keeps doubling.

Doubling time - the number of years it will take for the population to double in size.

Net migration rate - number of immigrants minus the number of emigrants (people who leave the country)

Demographic transition model - shows changing birth and death rates over time

Population pyramid—a graph which shows the age and sex structure of a population

Age structure - the 3 main structures of a population: under 15, 16-64 (working age), and 65+ (seniors) **Dependency ratio** - the proportion of the population which is dependent or supported by the working population: the % of the population under 16 + over 65 years

Populations change for 4 different reasons. What are they?					
1.	2.				
3.	4.				

I. Birth Rate/Death Rate

Demographers use rates per thousand or percentages when figuring population change.

a) In the US, there are 14 births per 1000 people. (crude birth rate)

- Express this figure as a %: _____
- **b)** The birth rate in Kenya is 3.2%.
 - There are _____ births per 1000 people.
- c) In 1999, Canada's population was about 30, 563,000. Canada's birth rate for that year was 1.1%. The death rate was 0.7%. Calculate the total number of births and deaths.

Births _____ Deaths _____

d) Calculate Canada's Rate of Natural Increase (%) using the 1999 data: _____

Name:____

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Country	Population (millions)	Births per 1000	Deaths per 1000	Natural Increase per 1000	Rate of Natural Increase (%)
India	1,214,464,000	23.0	8.5		
Russia	140,367,000	10.8	15.1		
Gabon	1,501,000	27.5	9.8		

II. Growth Rate

In order to accurately determine the growth of a population, the effects of **migration** must be taken into consideration. The **Growth Rate** of a country is determined by the equation below:

Birth Rate – Death Rate +/- Net Migration Rate (Immigration rate – Emigration Rate)

Population Growth Rate

a) Use the information in the table below to **calculate the growth rate** of Canada (note: this information is **not** accurate)

	Per 1000/ per year	Rate %
Births	11	1.1
Deaths	7	0.7
Immigration	9	0.9
Emigration	8	0.8

Canada's Growth Rate:

III. The Rule of Seventy (Doubling Time)

Human populations can grow at an **exponential rate**, as was the case in the 20th Century. For instance, it took **123 years** for the world population to increase from 1 billion to 2 billion, but only **33 years** for the population to increase from 2 to 3 billion.

According to the "Rule of Seventy," the time it takes a population to double is approximately equal to seventy divided by the growth rate per year: 70 / Growth Rate = D.T.

a) Using the data from the table on the previous page, determine how long it will take Canada's population to double:

IV. The Demographic Transition Model (DMT)

The DTM tries to explain changes in population by showing changes over a period of time in three elements: **birth rates, death rates** and **total population growth.**

This model is based on what has happened in **developed countries** (such as Canada).

Demographic Transition



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a) Examine the model once again and sketch the curve indicating Total Population Growth.

b) List the factors which lead to the population explosion experienced in stage 2:

Name:_

Population Pyramids

Use Counterpoints p. 371-374 to complete this section of the worksheet.

A population pyramid is a graph that shows the age and sex structure of a population. A series of horizontal bar graphs for the male and female populations are placed back to back at age intervals of 5 years, called **cohorts**.



Comprehension Questions:

1. Which segments of a population are the most dependent?

- 2. Why are large populations of young and old people worrisome for governments?
- 3. What evidence is there that the pyramid for Somalia has a high birth rate? What % of the population would you estimate is under the age of 15?

4. What does the pyramid for Canada tell you about the future population numbers in the country?

5. What potential problems might Korea face in the future?

- 6. In what stage of the demographic transition model is each of the pyramids?
 - a. Somalia
 - b. Peru
 - c. South Korea
 - d. Canada