**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_**

**POPULATION GROWTH EQUATIONS & PROBLEMS**

**Density & Birth/Death Rates**

Population density: *Population* Birth or death rate *= # of births/****or*** *# of deaths per year* *x 100%*

 *Area total population*

1. Island X is 5,000 square miles and contains 250,000 inhabitants. Last year 12,000 new children were born and 10,000 people were recorded as deceased. What is the current population density?
2. Calculate the birth rate and death rate for Island X.

**Global & National Population Growth Rate**

The **crude birth rate (CBR)** is the number of births per 1,000 individuals per year. The **crude death rate (CDR)** is the number of deaths per 1,000 individuals per year. The rate is expressed mathematically as

Global population growth rate = *[(CBR) – (CDR)]*

 *10*

\*Because the birth and death rates are expressed per 1000 people, we divide by 10 in order to represent the value as a percentage.

1. Worldwide, there were 20 births and 8 deaths per 1,000 people in 2009. Calculate the global population growth rate.

The formula for calculating a nation’s growth rate is a little different. While nations experience immigration and emigration, the global population does not. We are all one global population.

National population growth rate = *[(CBR + immigration)] – (CDR + emigration)]*

 *10*

1. Suppose Country X experienced 16 births, 8 deaths, and 6 immigrants per 1000 people for a particular year. Calculate the national population growth.

**What if numbers aren’t given as CBR or CDR?** Divide by the total population instead of 10.

1. There are currently 250,000 inhabitants on Island X. Last year 12,000 new children were born and 10,000 people were recorded as deceased. What is the population growth rate (r)?

 *r =* *Births - deaths x 100%*

 *total population*

1. A metropolitan region of 100,000 people has 2,000 births, 500 deaths, 200 emigrants, and 100 immigrants over a 1-year period. Calculate its population growth rate.

 *r =* *(births + immigration) – (deaths +emigration) x 100%*

 *Total population*

**Doubling Time of a Population: Use the Rule of 70!**

 *\_\_\_\_\_70\_\_\_\_\_\_* = doubling time (years)

 *Growth rate* ***%*** *(r)*

1. If Country X has a growth rate of 2%, how many years will this country take to double in size?
2. If Country Y has a growth rate of 5% how many years will this country take to double in size?