

Objectives: You will create a graph of human population growth and use it to predict future growth. You will identify factors that affect population growth.

### Statistics on Human Population

| Year A.D. | Number of People (in billions) |
|-----------|--------------------------------|
| 1650      | .50                            |
| 1750      | .70                            |
| 1850      | 1.0                            |
| 1925      | 2.0                            |
| 1956      | 2.5                            |
| 1966      | 3.3                            |
| 1970      | 3.6                            |
| 1974      | 3.9                            |
| 1976      | 4.0                            |
| 1980      | 4.4                            |
| 1991      | 5.5                            |
| 2000      | 6.0                            |
| 2004      | 6.4                            |
| 2008      | 6.7                            |
| 2012      | 7.0                            |

### Instructions for creating your graph.

Using a piece of graph paper, place time on the horizontal axis. Values should range from 1650 to 2020 (for predicting future population).

Place the number of people on the vertical axis. Values should range from 0 to 20 billion.

Make sure that your graph is a **full page** in size, that you have the correct labels for the X and Y axis, and title your graph.

### Analysis

1. It took 1649 years for the world population to double, going from .25 billion people to .50 billion people. How long did it take for the population to double once again? \_\_\_\_\_

2. How long did it take for the population to double a second time? \_\_\_\_\_ A third time?  
\_\_\_\_\_

3. Based on your graph, in what year will the population reach 8 billion? \_\_\_\_\_

4. Based on your graph, how many years will it take for the population of 2004 to double?  
\_\_\_\_\_

## The Earth's Carrying Capacity

Prior to 1950, the death rate was high, which kept the numbers of humans from increasing rapidly. In the 19th Century, the agricultural revolution increased food production. The industrial revolution improved methods of transporting food and other goods. In the 20th Century, advances in medicine, sanitation and nutrition have decreased the death rates further. These factors combined to produce the rapid growth of the human population in the 20th century.

As with any population, humans are also limited by factors such as space, amount of food and disease. *The carrying capacity is the number of individuals that a stable environment can support.* Authorities disagree on the maximum number of people that the earth can support, though the numbers generally range for 8 to 10 billion. As the population approaches its limit, starvation will increase. Some countries have a much higher growth rate than others. Growth rate is the number of people born minus the number of people that die.

Most countries are trying to reduce their growth rate. Zero population growth means that as many people are being born as there are dying. To achieve zero population growth, each couple would need to have no more than two children (to replace the parents). Even if this number is achieved, the population will continue to grow because the parents will still live on for decades, as their children have children and their children have children and so forth. The United States reached zero population growth in the 1980's, and yet the overall population of the US still increases.

### Analysis

1. What factors contributed to the world's overall population growth in the last 150 years.
2. Why does a population not level off during the same year it reaches zero population growth?
3. If the carrying capacity of the earth was 9 billion people, when would this number be reached (according to your graph)?
4. What will happen when the human population exceeds the earth's carrying capacity?