Name _____

Date _____ Class _____

Factors Determining Change in Size

Four main factors are directly responsible for the change in the size of a population. Two of these factors, the birth rate and immigration (migration in), increase the size of a population. The other two, the death rate and emigration (migration out), act to decrease the size of a population. The interaction of all four factors determines the size of a population.

Using a Graph to Extrapolate Population Size

Most populations change in size in a cyclical pattern. The one major exception to this has been the human population, which has steadily increased in size since the seventeenth century.

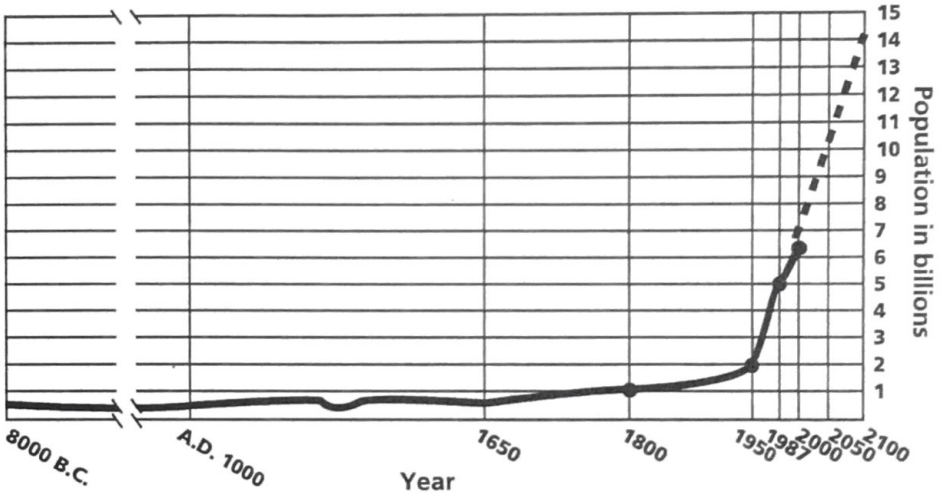


Figure 1
Human population increase

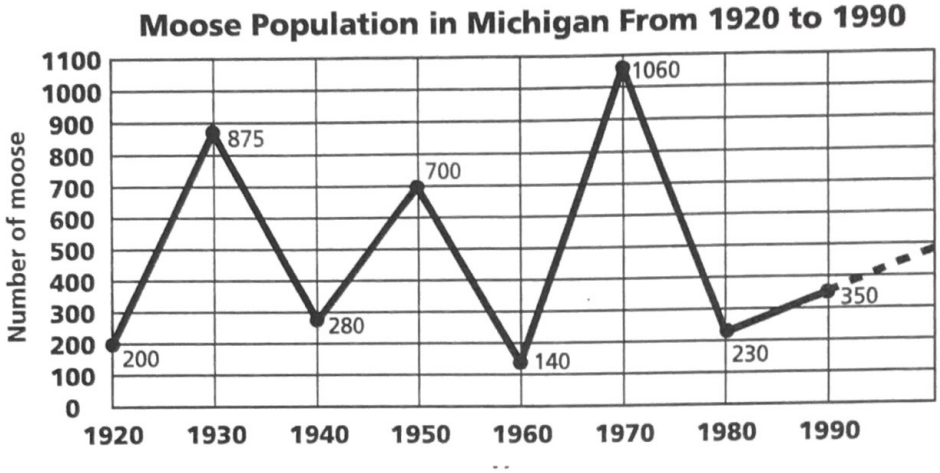
Take a careful look at the graph of the world population. How would you predict the population of the world in the year 2000 or beyond? The process of making a prediction beyond the data points in a graph is called **extrapolation.**

To extrapolate data, begin with a data point on the graph that indicates a new trend, if possible. In the graph of world population, a sharp increase is seen to begin in 1950. We cannot predict events that might negatively affect human population growth, so we assume that it will follow the trend set in 1950. Draw a straight line from 1950 through the data point at 1987, to the edge of the graph, as indicated by the dashed line. What does the graph indicate that the population might be in the year 2050? What is the extrapolated population in the year 2100? Do you believe these are reasonable human population extrapolations?

Many experts predict that the Earth will not be able to support a human population much larger than it is now and that the trend of population increase will change. The farther from the original data point extrapolations are made, the less certain we can be of our predictions. Can you be as certain of a prediction for the year 2100 as you can be of a prediction for the year 2000?

Several teams of scientists have studied a population of moose on a nature preserve in Michigan since 1920. Estimates of the size of the population are shown in the graph below.

Figure 2
Estimated moose population, 1920-1995



An examination of the graph indicates that the size of the moose population changes, as shown by the peaks occurring approximately every 23 years. The population increased from 1980 to 1990. While we cannot be absolutely certain, we can assume that the population will increase for a number of years and peak in approximately the year 2000. Is it reasonable to extrapolate and assume that the maximum population will be between 700 and 1,200 individuals in 2000? By examining the increase from 1980 to 1990, you will notice that it is not as steep as it had been in the past. A more reasonable extrapolation would be that the moose population may be between 450 and 500 in the year 2000.