

Name _____

A.P. Environmental Science

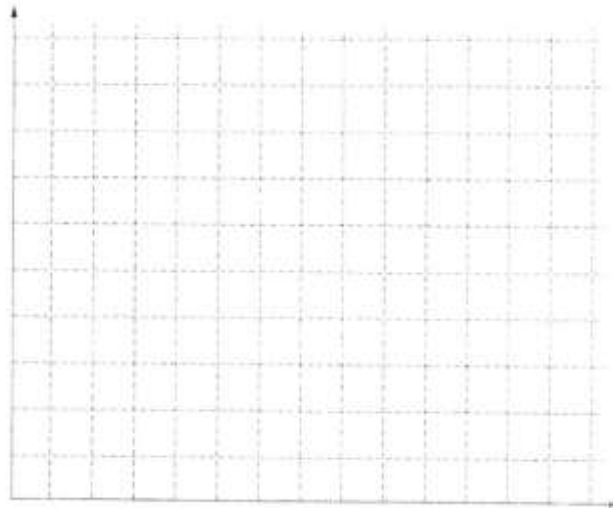
Date _____

Mr. Romano

A certain fictional country called Moderna is tracking its population data. In 1855, the first year vital statistics were reported for the country, the population was 1.6 million, with crude birth rate of 43 per 1,000. At that time the population of Moderna was growing quite slowly, because of the high death rate of 41 per 1,000. In 1875 the population began to grow very rapidly as the birth rate remained at its 1855 level, while the crude death rate dropped dramatically to 20 per 1,000. Population growth continued to increase in the small country into the late 1800's, even though birth rates began to decline slowly.

In 1895 the crude birth rate had dropped to 37, and the death rate to 12 per 1,000. In that year (1895) a complete census revealed that the population of Moderna had grown to 2.5 million. By 1950 population growth gradually began to decline as the death rate remained at its 1895 level, while the birth rate continued to decline to 22 per 1,000. In 1977 vital statistics revealed that the death rate was 10 per 1,000 and that population growth had slowed even more to an annual rate of 0.4%. By 1990 Moderna had reduced its birth rate to that of its now constant low death rate, and the population transition was complete.

- a. Construct a Data Chart and include the information provided, as well as calculations that need to be made. The chart should include the years mentioned, crude birth rate (CBR), crude death rate (CDR), formula set up for rate of population growth (excluding migration, since that data isn't available), rate of population growth (r), and population size (for the years indicated).
- b. On a graph, plot the crude birth rate data from 1855 to 1990. Now plot the crude death rate data on the same axes. Clearly label the axes and the curves.



- c. What was the annual growth rate of Moderna in 1950? What was the birth rate in Moderna in 1977? Show the work that supports your answers.
- d. Determine what the population size of Moderna would have been in 1951 if the population had continued to grow at the annual rate of growth recorded for Moderna in 1895. Show all work to support your answer.
- e. Indicate TWO factors that might have accounted for the rapid decline in the death rate in Moderna between 1855 and 1895. Indicate one specific reason why the birth rate might have been so high in 1855 and was so slow to decrease between 1855 and 1950.