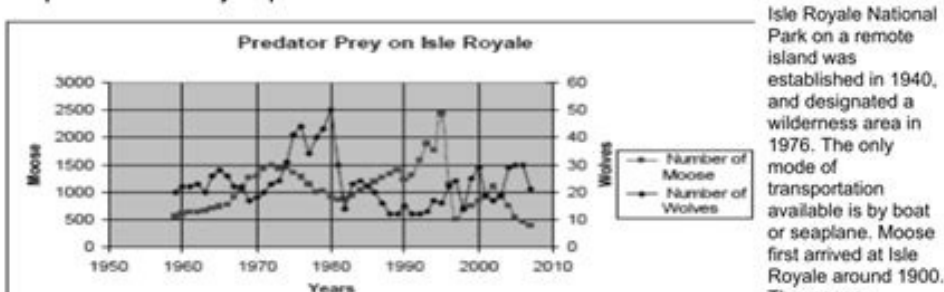


I'm not robot!

Graph 5 – Predator-Prey Graph



Isle Royale National Park on a remote island was established in 1940, and designated a wilderness area in 1976. The only mode of transportation available is by boat or seaplane. Moose first arrived at Isle Royale around 1900.

The moose population tends to increase in years with mild winters, early spring green-up, abundant winter forage, low wolf numbers and low levels of tick infestation. Wolves first arrived at the island on an ice bridge from Canada in 1940. Disease has also influenced the wolf population. Between 1980 and 1982, the wolf population declined from 50 to 14, due to canine parvovirus.

1. What is the greatest moose population? What year did that occur? What was the wolf population when the moose population the greatest?
2. What would happen to the wolf population if the moose population decreases?
3. What would happen to the moose population if the wolves were removed from Isle Royale?
4. Describe the pattern between the wolf (predator) population in relation to the moose (prey) population.
5. Identify a factor, other than moose population, that has influenced the wolf population in Isle Royale.
6. Identify two factors, other than the wolf population, that may influence the moose population.
7. Isle Royale has been undeclared as a national park and has been purchased by a large resort. Describe one positive and one negative impact on the Isle Royale ecosystem.
8. Are predator-prey relationships density-dependent or density-independent limiting factors? Explain.

Laboratory: Human Population Growth

Mrs. Côté Answer Key Enviro. Science 120

Pre Lab Work:

Before beginning this laboratory, answer the following questions on your own piece of paper in your notebook:

1. Define the following terms:
  - a. growth rate – describes how fast a population is increasing or decreasing and is dependent upon the birth rate and death rate
  - b. birthrate – is the number of infants born in a given year/1000 people in the population
  - c. death rate – is the number of people who die in a given year/1000 individuals in the population
  - d. zero population growth – when the population is in equilibrium or the number of births and deaths are equal
  - e. developed country – countries that highly developed economy and advanced technology
  - f. developing country – countries that are considered to have low standard of living, and undeveloped industrially
  - g. demographic transition – refers to the transition from high birth and death rates to low birth and death rates
2. What is a population explosion? How quickly is our population growing each year? What about each day?  
A population explosion is when a population lacks limited resources so is able to grow out of control. The human population is grows about 80 million a year and 219, 178 each day.
3. How is the growth rate of the human population calculated?  
Growth rate = birth rate – death rate
4. What causes a negative population growth? What causes a positive population growth?  
Negative population growth occurs when the birth rate is less than the death rate  
Positive population growth occurs when the birth rate exceeds the death rate
5. Why do the two graphs appear to have a different shape?  
The population growth rate was much slower in the earlier years. The J-curve shows exponential population growth and the graphs are not drawn to the same scale.

6. Using a piece of paper, create the following charts:

Country	Birthrate (%)	Death rate (%)	Population Growth 2005	Population Growth 2050	Demographic Transition	Relative Place in Transition	Sketch graph showing Blue & Pink Line
USA	2.06	0.51	0.92	-0.06	3.55	5	

Human Population Growth Data Handout  
5 Graphs on the Population Crisis

Human Population Growth Graphing Activity & Analysis

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

**PART I: Graphing and Analysis Questions**

**To Graph:** (1/2 sheet of graph paper in journal)

1. Place time on the horizontal access. (Values should range from 1650 to 2020)
2. Place number of people on the vertical access. Values should range from 0 to 20 billion.
3. Make sure you have the correct labels for the X and Y access and a title for your graph.
4. Answer Analysis Questions in your notebook

**PART II: Reading and Analysis**

Read the passage and answer the questions

**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 good. 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. Compare the growth rates of the following countries

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.

**U.S. Population data from 1650 to 2015**

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
*2015	7.3





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