26.1 Population—More Is Less: Background Information

What is the most pressing environmental issue of our time? Is it acid rain? Air pollution? Deforestation? While some authorities might answer differently, most would agree that the problem of human **population** growth is of major importance.

To see why this is so, we need to consider two aspects of human population growth: the **quantity** of human life and the **quality** of human life. First, let us consider the quantity of human life.

Population growth occurs when the number of organisms entering a population exceeds the number of organisms leaving it. The population of a city, for example, grows if the people moving into it **(immigration)** plus the number of people born in it is greater than the sum of the number of people moving out **(emigration)** and the number of deaths. When considering the Earth, we need to consider the **birth rate** (number of live births per 1,000 people in a year) as compared to the **death rate** (number of deaths per 1,000 people per year).

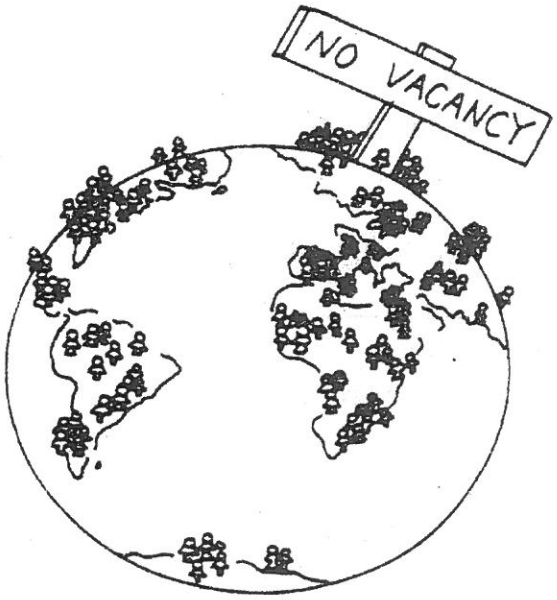
For most of human existence, the death rate nearly equalled the birth rate, and the population grew very slowly. It took perhaps 2 billion years for the human population to reach 1 billion, about the year 1810. It took only 117 more years to add the second billion (1927), only 33 years to add the third billion (1960), 14 years to add the fourth billion (1974), and only 13 more years to reach 5 billion in 1987. It is predicted that the Earth's population will reach 6 billion people by 1998. This type of growth is called **"exponential growth."** Part I of this activity will allow you to investigate exponential growth.

As you do Part I, keep the following growth rates in mind:

The World:	1.8% per year	Africa:	2.9% per year
Latin America:	2.1% per year	Asia:	1.9% per year
United States:	0.7% per year	Europe:	0.3% per year

Those who study populations, **demographers**, often consider the **doubling time** for a population. We can see that the population of Earth is expected to double between 1960 and 1998, a doubling time of less than 40 years! Compare this to the 117 years that it took to double from 1 billion in 1810 to 2 billion in 1927, and the 47 years that it took to double again to 4 billion!

Any place on earth can support only a certain number of any type of organism. That is its **carrying capacity**. We do not know what the Earth's carrying capacity for people is. Some demographers feel that we have already exceeded it. Others think that our ability to manipulate our environment will enable us to support even more people. Regardless of how many people can possibly subsist on Earth, how many of us should there be? Is our goal to have as many people as possible existing on Earth, or is our goal for people to have happy, healthy, fulfilling lives? The United States has about 4.3 percent of the world's population but uses about 30 percent of the resources that are consumed each year. Is it possible for *all* people to achieve the standard of living that we in the United States now enjoy?



The size of a population can be affected by FOUR factors:

1. Immigration: _____

2. Emigration: _____

3. Birth Rate: _____

4. Death Rate: _____

Increases Population	Decreases Population

Exponential Growth: _____

Logistic Growth: _____

Demographers: _____

Doubling Time: _____

Carrying Capacity: _____

The US makes up _____% of the world's population and uses _____% of the resources each year.

Name _____ Class _____ Date _____

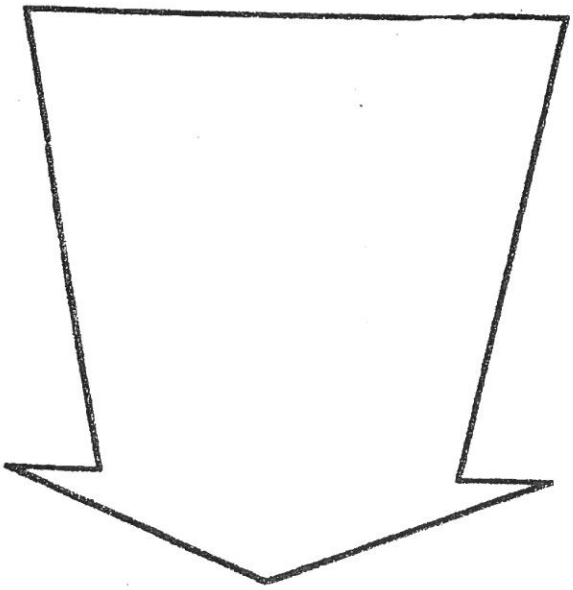
26.2 Population—More Is Less: Instructions
Part II: Quality or Quantity?

1. As a team, discuss the items listed below. Decide whether each item is generally "good" for people and the environment or is generally "harmful."
   - If it is "good," place a green "+" in the space beside the item.
   - If it is "harmful," place a red "–" in the space.
   - If your team really can't decide, place a black check in the space.

___ clean water	___ polluted air	___ food	___ opportunities for solitude
___ energy	___ minerals	___ wildlife	___ endangered species
___ noise	___ space to live	___ acid rain	___ contagious disease
___ buildings	___ cars and roads	___ garbage	___ traffic congestion
___ overgrazing	___ unemployment	___ poverty	___ available housing
___ hunger	___ soil erosion	___ oil spills	___ international conflicts
___ material luxuries	___ forests	___ crowded cities	___ recreational space

2. Now consider the effect of a significantly increased human population on each item. If increasing the human population would tend to increase the item, write the item inside the arrow pointing upward. If increasing the human population would tend to decrease it, write the item inside the arrow pointing downward.
   - Use a red writing tool for the "harmful" things.
   - Use a green writing tool for the "good" things.

Increased human population tends to **DECREASE:**



Increased human population tends to: **INCREASE:**