

2.1.2 Populations Key Information:

If you are unfamiliar with how to mark the text, please read the following instructions:

1. Before reading, please **number the paragraphs**. (Start with the number one and continue numbering sequentially throughout, placing the number near the start of the paragraph.)
2. **Circle** key terms and other essential words or numbers.
3. Put a **box** around any terms you do not know the meaning of or are unfamiliar with.
4. **Underline** information relevant to the reading purpose.

Describing populations is an interesting problem for population biologists. We can measure everything from microscopic bacteria to the global human population. The issue of scale plays a main role in how we study and collect information. A population is defined as members of the same species in a certain area at a certain time.

Populations can grow in two main ways: exponentially or logistically. Exponential growth is

basically unlimited and follows the basic graph form $y = Ae^{kt}$ where y , the number of the population is a function of t , time. The graph is typically called a J-shaped curve. Exponential growth occurs when there are no limits on growth -- there is essentially unlimited food, space, no predators or disease, no natural disasters, and easy ways to get rid of biological waste.

Logistic growth is when the population has reached a limit and remains mostly steady. This can occur if the population runs out of food or is limited by predators, disease or other natural mechanisms. The graph of logistic growth is typically called an S shaped curve. The maximum population possible is usually called the carrying capacity and is abbreviated as K .

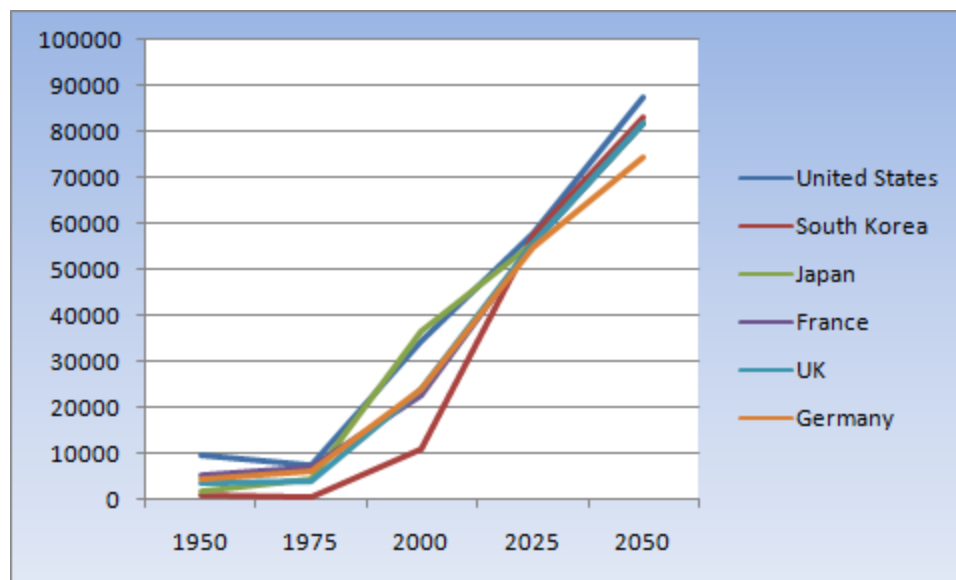


Figure 2.1.2 A graph showing South Korea's **exponential growth** of GDP per capita with other advanced economies.

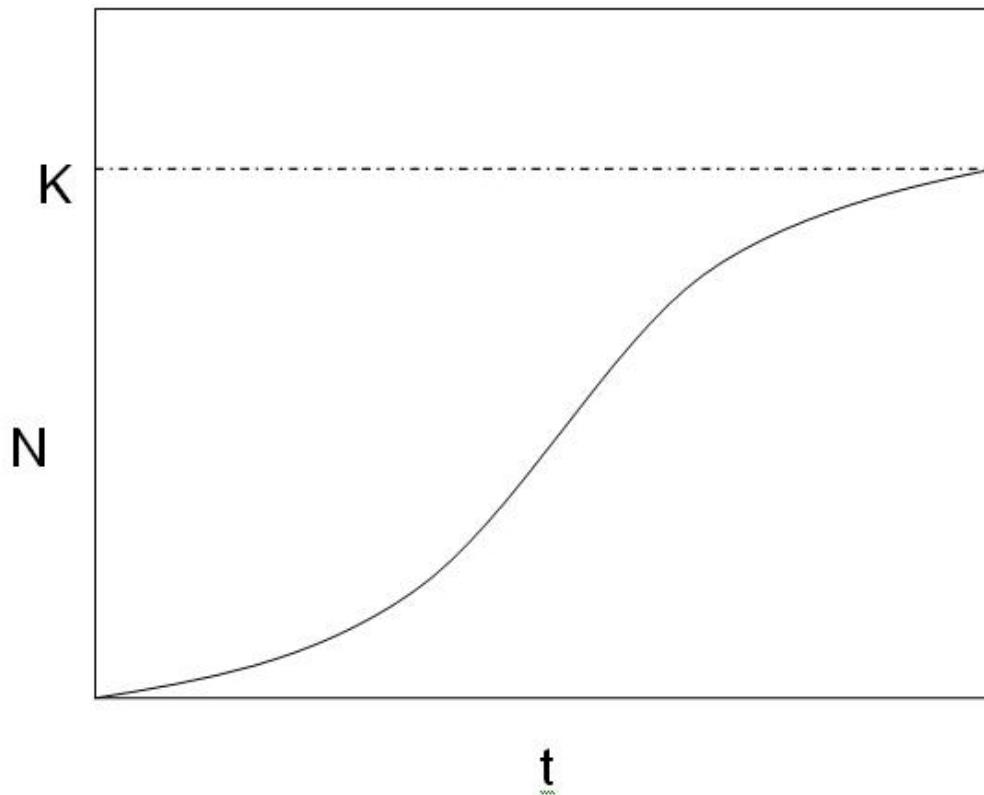


Figure 2.1.3 A graph showing **logistic growth** and the carrying capacity K . N is the number in the population and t represents time.

[Carrying Capacity](#) by [Simon Pierre Barrette](#) / [CC BY-SA 3.0](#)

Scientists also measure births, deaths, and movements of populations. The birthrate is the number of births (usually per year) and the death rate is the number of deaths (also, usually per year). We also measure migrations or movement of individuals from one area to another. For example, people can move from one country to another. Immigration means coming to a new country and emigration means leaving a country. Usually these terms apply to populations of people but sometimes they are used to describe changes in plant and animal populations as well, such as migration, interaction between species, the founder effect, and invasive species.

There are many factors that can limit population growth. These factors are separated into two categories: population dependent and population independent growth factors. I like to think of these as also 'death factors' because they are really causing deaths or lack of growth. Population dependent limiting factors have a stronger effect with larger populations. They include competition for food, water, space, and mating. Predators, animals that eat other

animals, can limit a population by eating their prey. Herbivores, animals that eat plants, can limit growth of plant populations. Parasites and disease spread more quickly through larger populations, specifically in cities with unclean waste or water. This was one of the problems with the plague - it spread easily on rats in cities without modern sanitation. Population independent limiting factors impact everyone in the population regardless of size. Basically, everybody suffers and it doesn't matter if you are living in a small or large population. Density independent limiting factors include natural disasters such as fire, drought, flood, volcanoes, and hurricanes. For example, if a volcano blows up and lays waste to an island, it doesn't matter if there are 5 rabbits or 5,000 rabbits living there - they are all going to die.

You now want to share the information you learned with the world! In the space below, please write imaginary "[tweets](#)" that allow you to briefly summarize the important information from each of the four paragraphs. Remember, a "tweet" can only contain 140 characters, so you must do your best to be brief while also including the essential information for each of the four paragraphs.

Tweet 1: (paragraph # 1 in article)

Tweet 2: (paragraph # 2 in article)

Tweet 3: (paragraph # 3 in article)

Tweet 4: (paragraph # 4 in article)
