



Learning Objective

- * To define population, community, ecosystem and ecology
- * To list examples of biotic and abiotic factors which limit population growth
- * To explain the form of a typical growth curve
- * To understand the form of a human population growth curve

Ecology and Ecosystems

- * Ecology: how living things interact with each other and with their environment or study of ecosystems.
- * Ecosystem: made up of non living part(habitat) and living part(community)
- * Community: All plants and animals that live in a habitat.
- * Population: Group of individuals of the same species.

Checks on Population growth

Downloaded from eduresourceza.com

Biotic factors:

- * **Food:** both the quantity and quality of food are important. Ex: Snail need calcium for shell growth and cannot reproduce if this mineral is lacking even when ample amount of food is there.
- * **Predators:** feed on prey and this limits the numbers in the prey population. If number of predators fall then prey species increase in number.

Downloaded from eduresourceza.com

Checks on Population growth

- * **Competitors:** Other organisms may require same resources such as food and reduce the growth of a population.
- * **Disease:** Often caused by parasites can slow down growth and reproductive rate of organisms within a population. It can spread quickly through large populations and act like predation to reduce the numbers.

Checks on Population growth

Downloaded from eduresourceza.com

Abiotic factors:

Temperature: Higher temperatures speed up enzyme catalyzed reactions and increase growth.

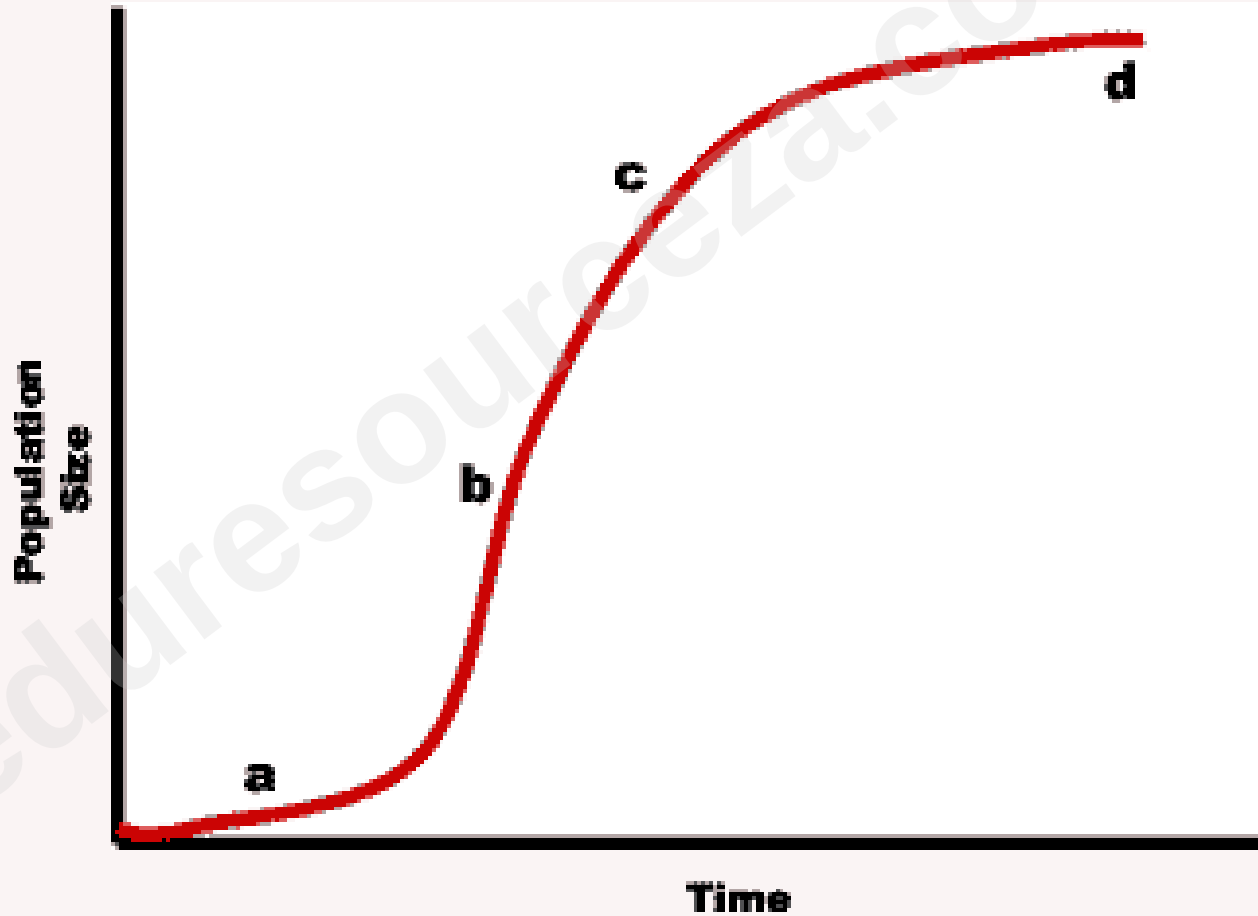
Oxygen Availability: Affects the rate of production of energy by respiration.

Light Availability: for photosynthesis. Light also control breeding cycles in animals and plants.

Toxins and Pollutants: Tissue growth can be reduced by the presence of Sulphur dioxide and reproductive success may be affected by pollutants.

Downloaded from eduresourceza.com

Growth Curve



Growth Curve

A. Lag Phase: Population growing slowly as the number of mature reproducing individuals is low.

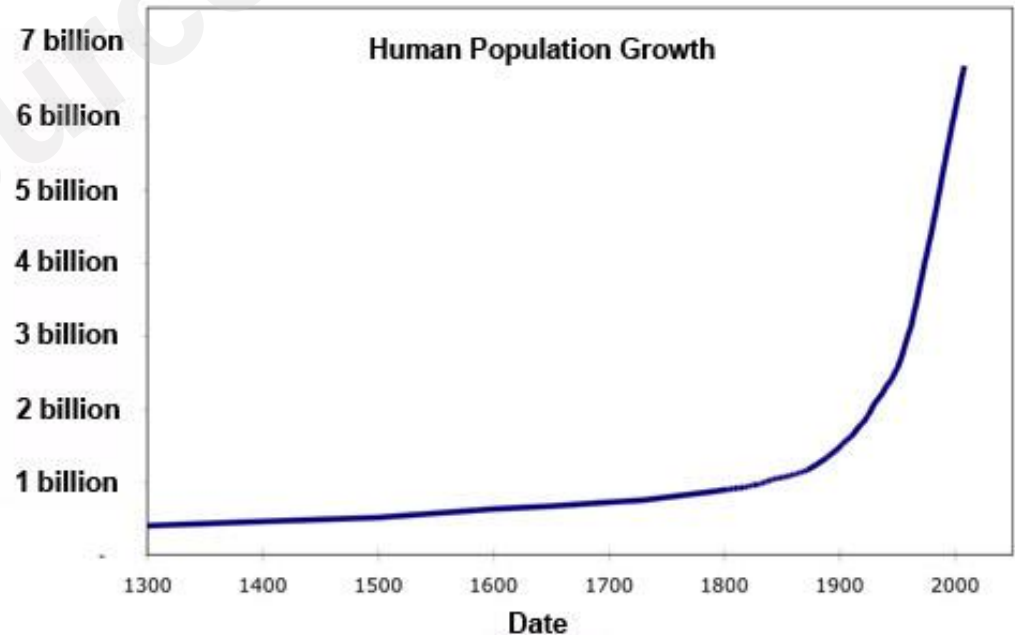
B. Log Phase: Maximum growth rate. Compromise between biotic potential (ability to breed) and initial environmental resistance is observed.

C. Population growth decelerates: Environmental resistance (limiting factors) become dominant, increasing the death rate and decreasing the birth rate.

D Stationary phase: Birth rate and death rate balance each other.

Human Population Growth curve

- * Three major changes in human activities led to significant increase in the world population over the past 300 years.



Growth of Human Population

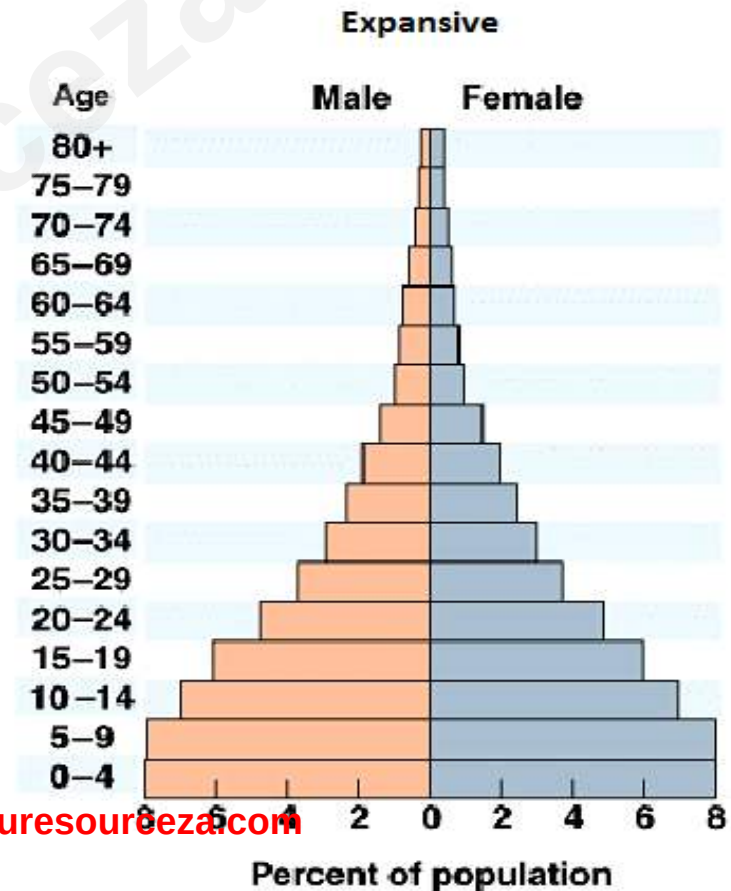
Medical Revolution: Improvements in sanitation and the control of infectious diseases reduced the number of deaths.

Industrial revolution: Development of machinery increased agricultural efficiency and improved housing conditions. More people earned enough money to be able to afford large families and the number of births increased.

Agricultural Revolution: Human settlers became more efficient in farming. More food became available and part of environmental resistance to human population was reduced.

Age (Population) Pyramid

- * Shows the age structure of a population – the percentage of males and females in each age group in a country



Population Pyramid

This is affected by:

- * **Food availability:** Countries where a balanced diet might be difficult to obtain show a high death rate amongst infants due to deficiency of proteins and vitamins.
- * **Hygiene:** Food poisoning and water borne infections can increase the death rate due to diarrhea and dehydration.

Population Pyramid

- * **Medical provision:** Vaccinations programs reduce death rate and care during childbirth reduce deaths among young women.
- * **Working conditions:** unsafe work, ex: mining increase death rate among young people
- * **Political instability:** this can lead to civil wars with serious effects on death rates.