

PROPERTIES OF POPULATIONS

A POPULATION IS A GROUP OF POTENTIALLY INTERBREEDING AND INTERACTING INDIVIDUALS OF THE SAME SPECIES AT THE SAME TIME.

POPULATIONS HAVE UNIQUE FEATURES. THEY HAVE AGE STRUCTURE, DENSITY, AND DISTRIBUTION IN TIME AND SPACE.

THEY EXHIBIT A BIRTH RATE, A DEATH RATE, AND A GROWTH RATE.



- THEY RESPOND IN THEIR OWN WAYS TO COMPETITION, TO PREDATION, AND TO OTHER PRESSURES.
- THE RELATIONS OF ONE POPULATION WITH ANOTHER INFLUENCE THE STRUCTURE AND FUNCTION OF WHOLE ECOSYSTEMS.



PLANT POPULATIONS ARE COMPLEX

- The tree is a collection of modules :
- Buds, twigs, shoots, flowers, and leaves above ground, and roots and their extensions below ground.
- These modules have their own demography (birth, date, growth rate).



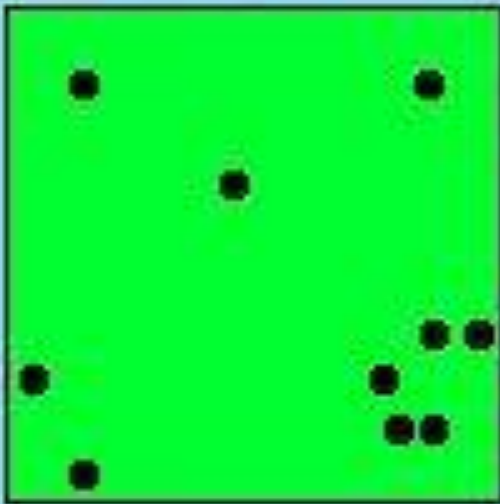
DISPERSION OF INDIVIDUALS INFLUENCE POPULATION DENSITY

- Individuals of population may be distributed randomly, uniformly, or in clumps.

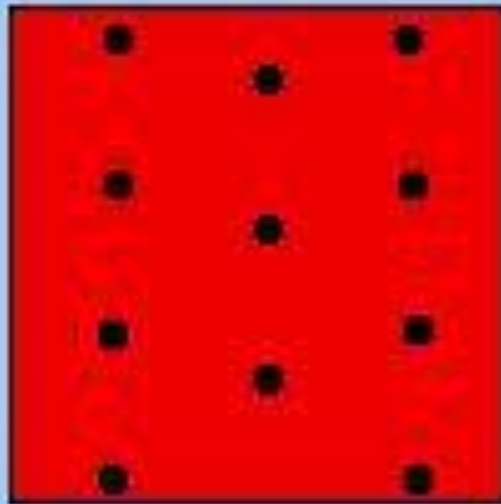


Population dispersion

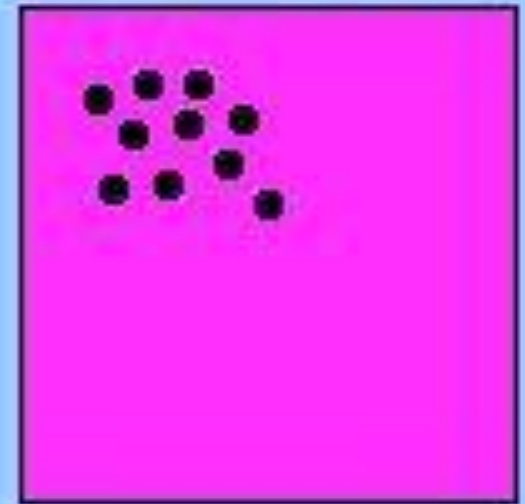
Random



Uniform



Clumped



DETERMINING DENSITY AND DISTRIBUTION REQUIRED SAMPLING

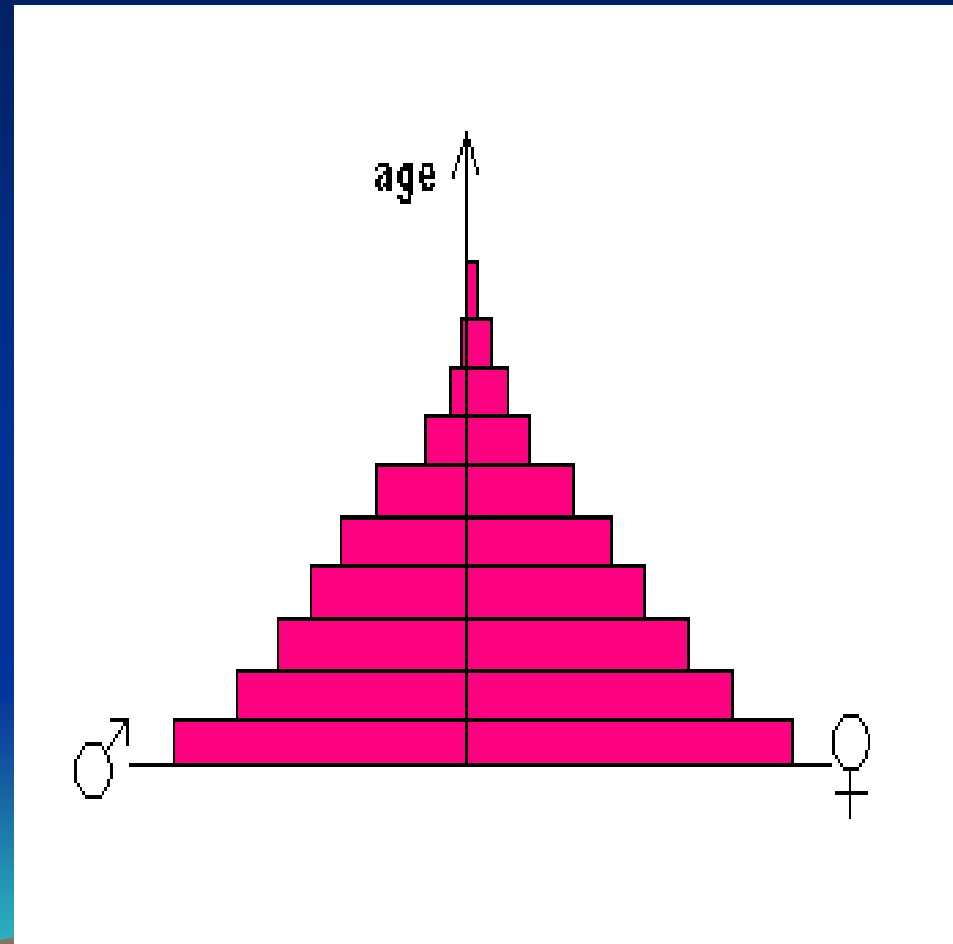
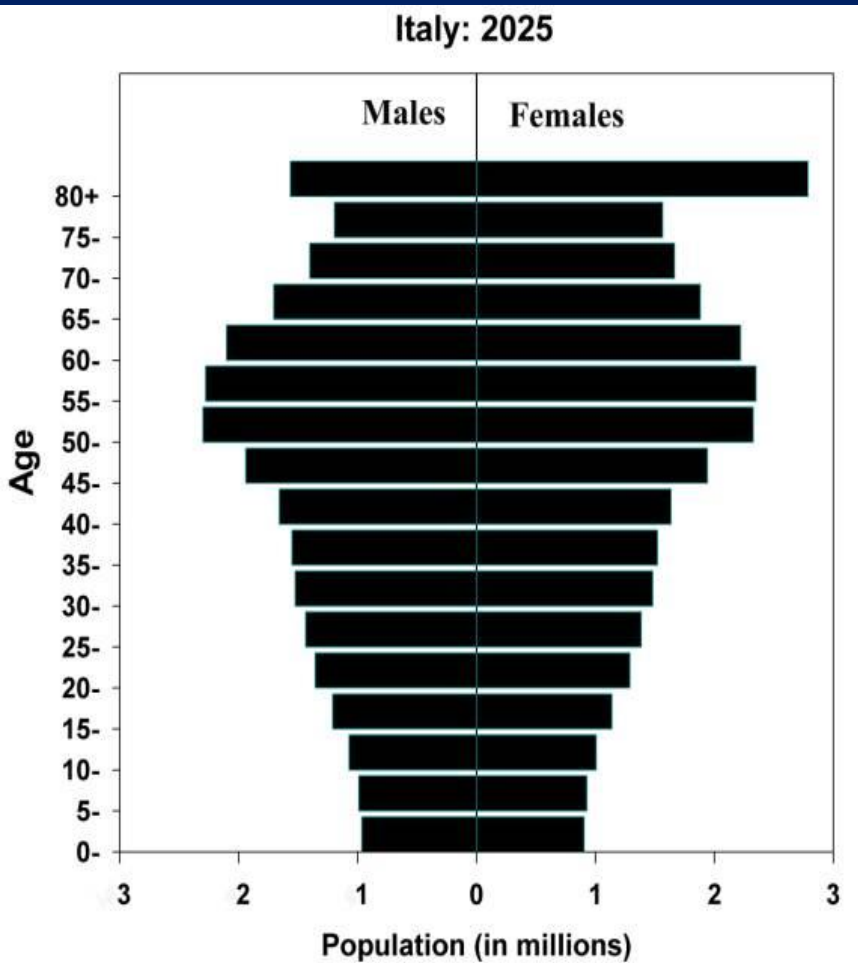
- **Plant and sessile animals :**
- Researcher divide the area of study into subunits, in which they count animals or plant . From the data they determine mean density of unit sampled.
- **For mobile populations :**
- Sometime they use ***mark and recapture technique.***



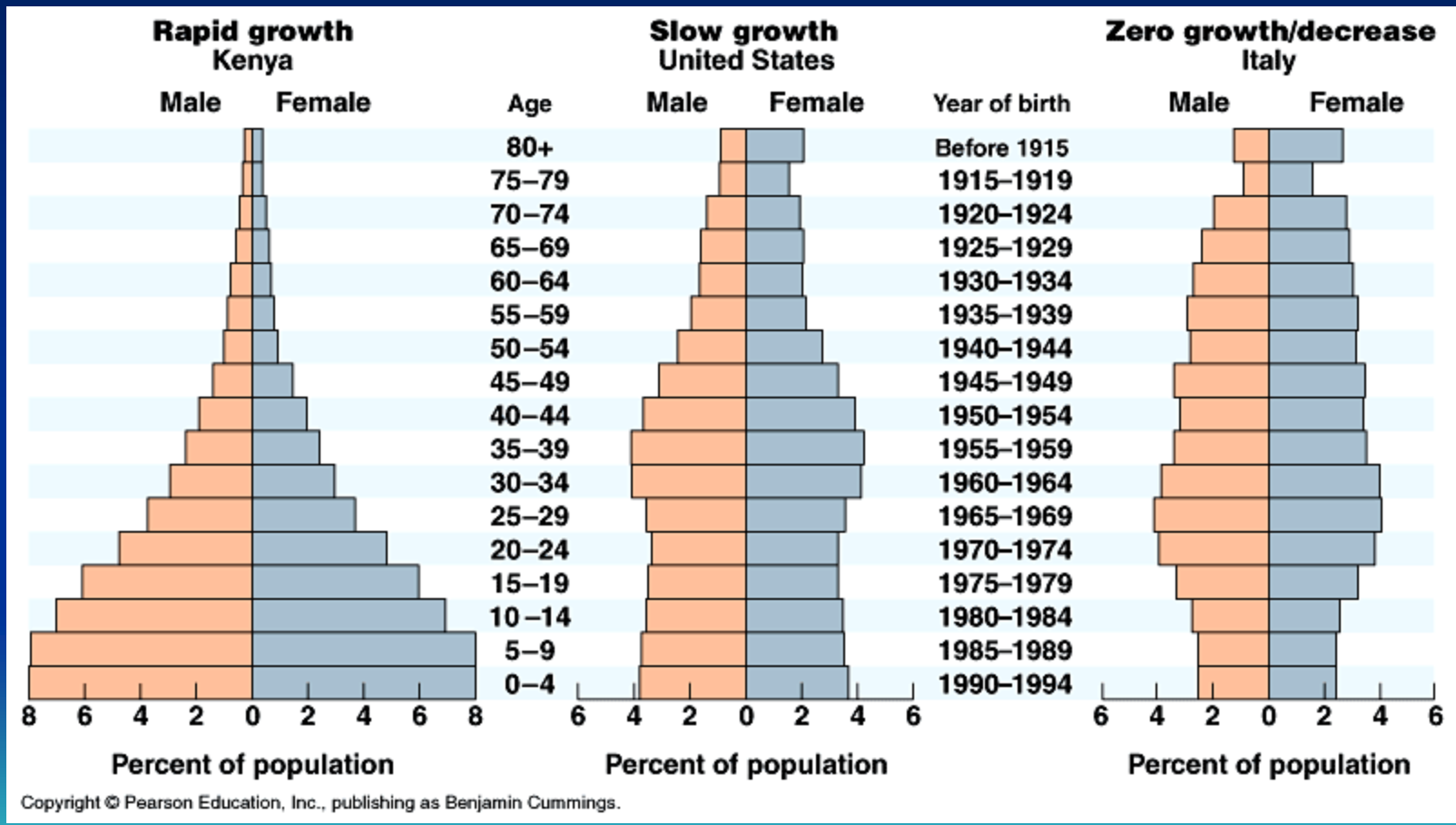
POPULATION HAVE AGE STRUCTURE



Population have age structure



Age Pyramids

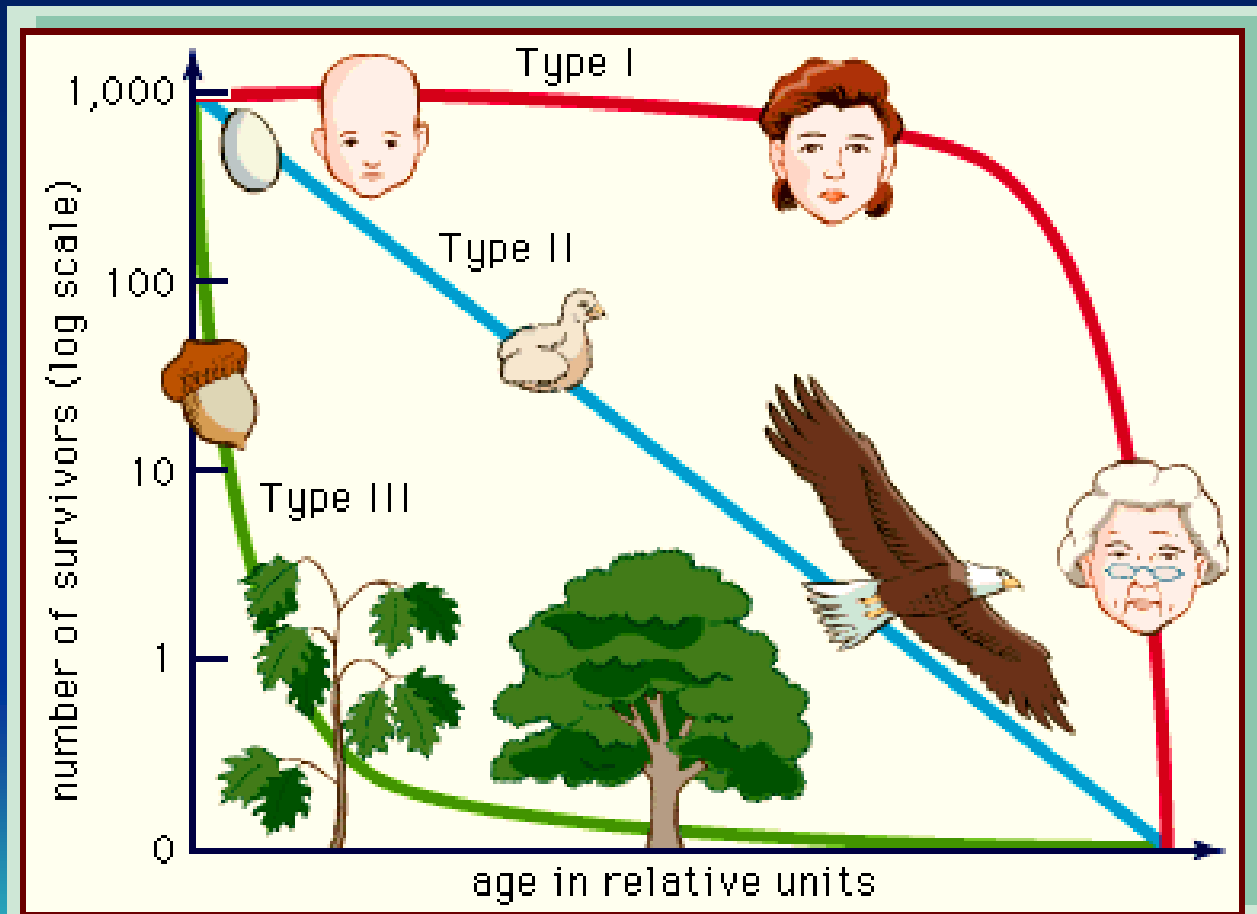


POPULATION GROWTH

- Mortality as the probability of dying or surviving.
- Mortality rate : The number of individuals dying in a given period.
- Life tables give a systematic picture of mortality and survival.
- Plant life tables more complex.



Three type of survivorship curves



NATALITY IS AGE-SPECIFIC

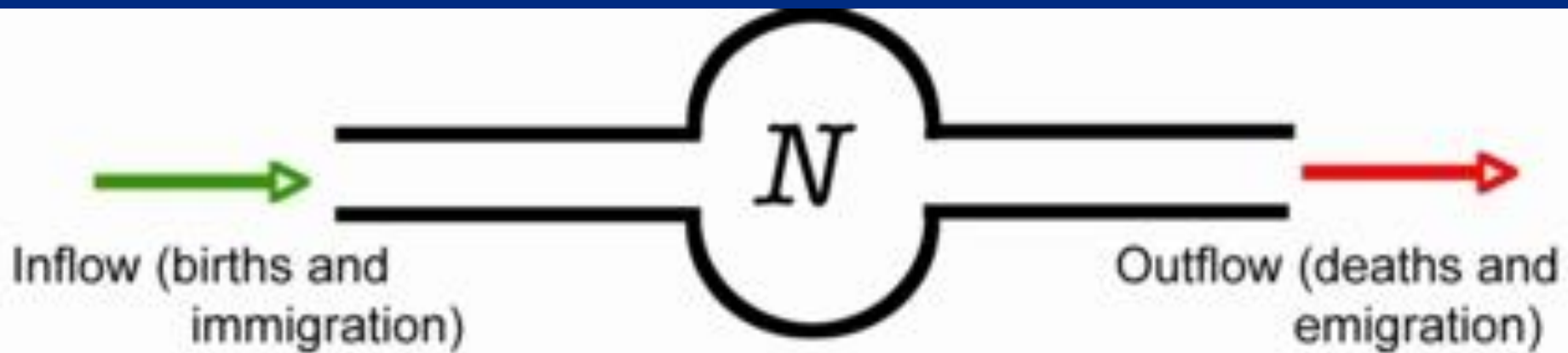
- Natlity rate : birth per 1000 population per unit time.
- Crude birth rate
- Age-specific schedule of births.
- Gross reproductive rate
- Net reproductive rate
- Natality and survivorship determine reproductive rate.
- Net reproductive rate is an estimator of population growth



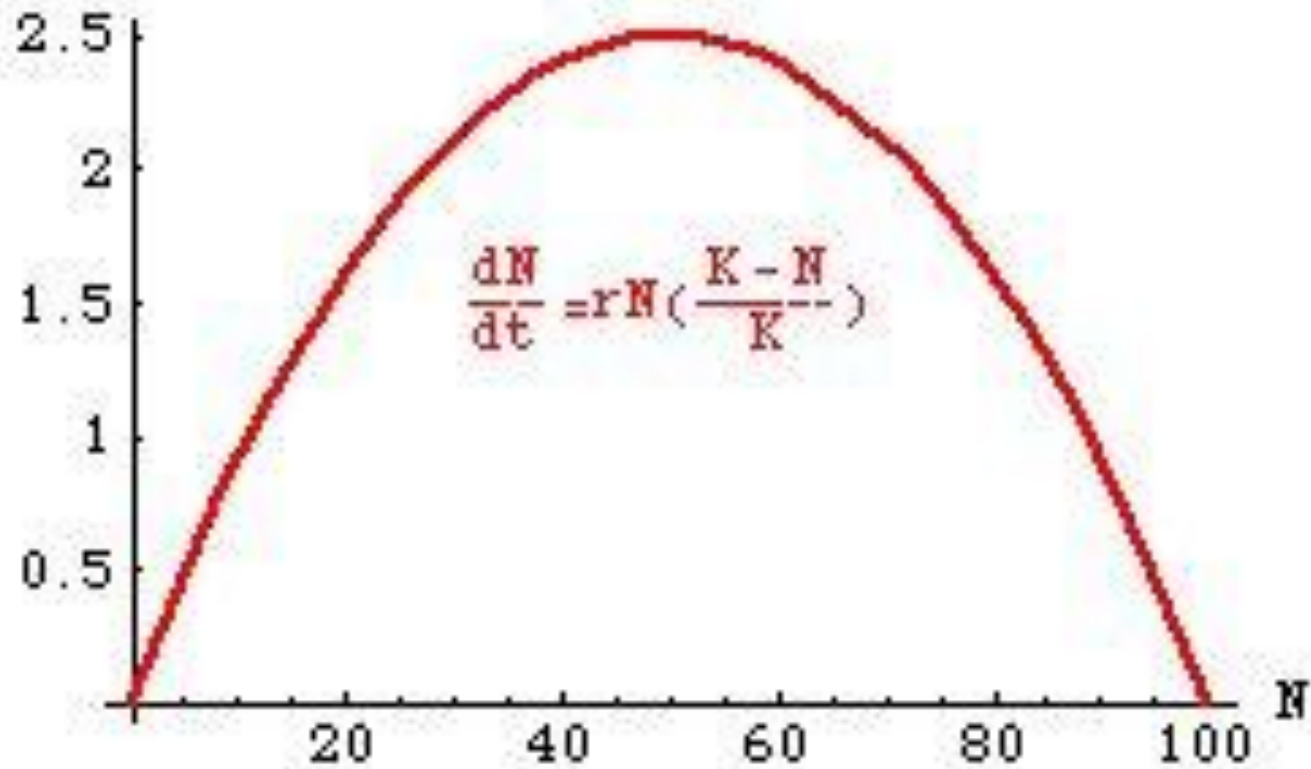
Population growth

- General formula :
- $(b + i) - (d + e)$
- b = birth
- i = immigration
- d = death
- e = emmigrtion

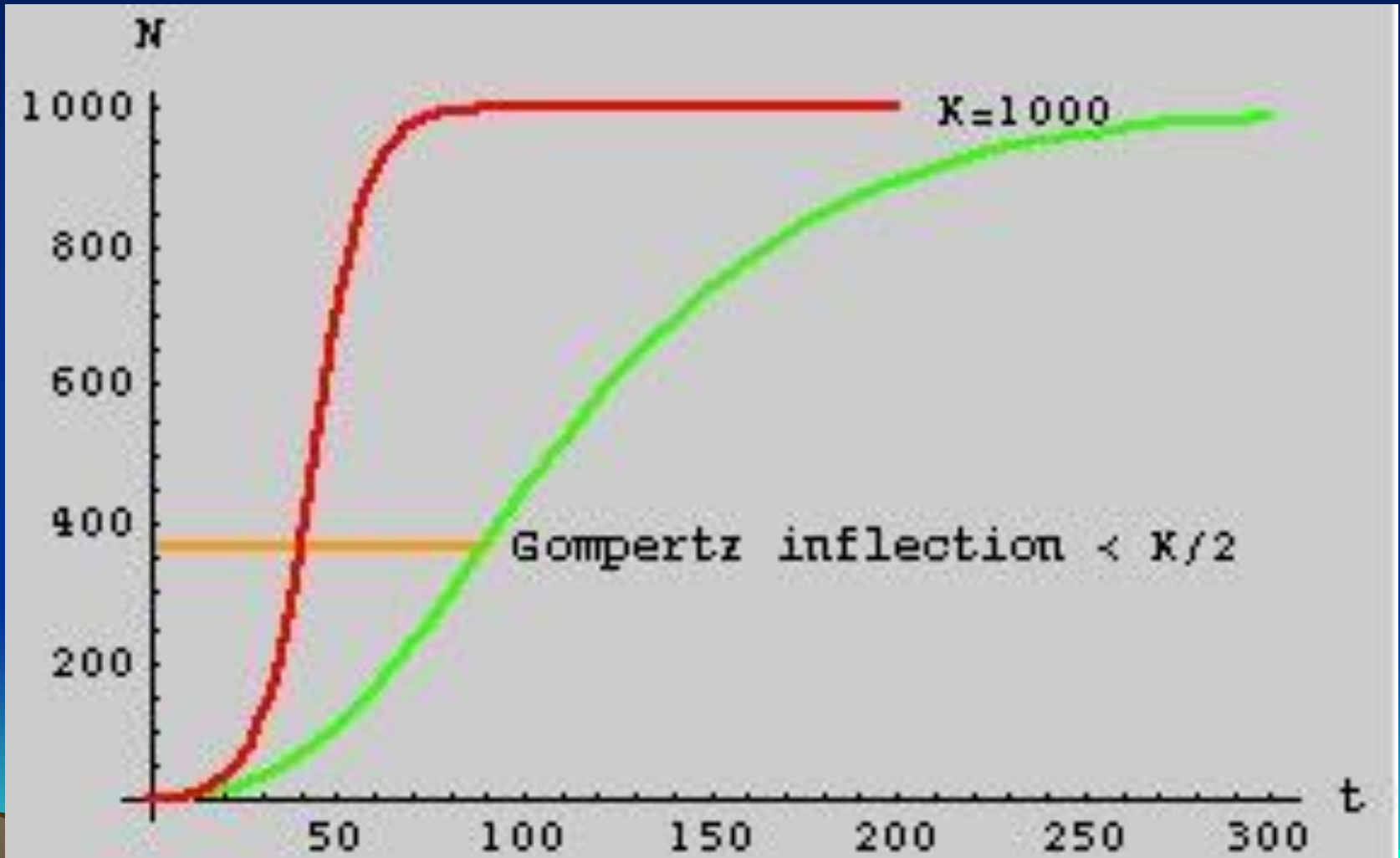




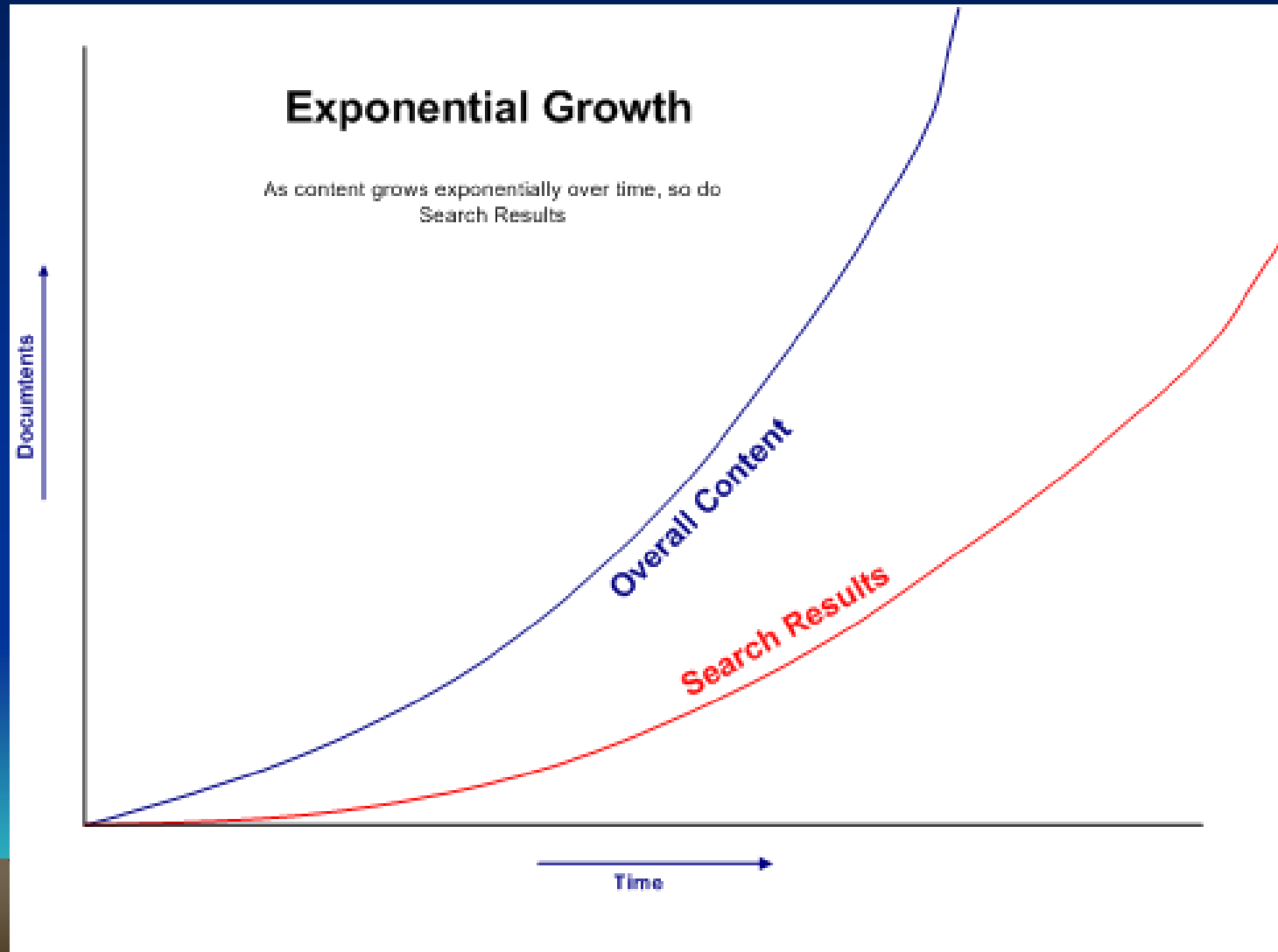
1st derivative = slope



Logistic growth



Exponential growth



- Population growth is limited by the environment
- Populations fluctuate
- Low populations can decline toward extinction
- Extinction of species begins locally

