|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | |  |
|  |  | .navigate |  |  | we don't need no .introduction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  |
|  | [[home](http://docs.google.com/index.htm)]  [[abstract](http://docs.google.com/abs.htm)]  [[introduction](http://docs.google.com/intro.htm)]  [[hypothesis](http://docs.google.com/hypo.htm)]  [[experiment](http://docs.google.com/exp.htm)]  [[data](http://docs.google.com/data.htm)]  [[conclusion](http://docs.google.com/conc.htm)]  [[we recommend](http://docs.google.com/rec.htm)]  [[daily log](http://docs.google.com/log.htm)]  [[other](http://docs.google.com/other.htm)]  [[bibliography](http://docs.google.com/bib.htm)] |  |  | ***How do we model population growth?***   *Java applet courtesy of Dr. J.G. Sevenster [*[*website*](http://rulbii.leidenuniv.nl/wwwkim/popdyn.html)*]*    There are two polar extremes in organism growth.  Some organisms, the r-strategists, grow exponentially, and quickly breach the carrying capacity.  This overproduction of offspring is usually soon followed by a sharp drop in population because the ecosystem cannot support such a large amount of organisms.  These r-strategists follow an exponential equation of growth.  The exponential model of growth was presented by the famous British economist, Thomas Robert Malthus (1766-1834) (Microsoft Encarta), who stated that populations tended to increase much faster than the supply of food.  The exponential equation for growth of a population is:    dP/dt = (b � m)\*P = r\*P    dP/dt is the change in population with respect to time.  �b� stands for the amount of births in the time interval, �m� stands for the amount of deaths in the time interval, and P is the population size.  (b � m) can be abbreviated by r, which is the rate of the exponential.  There are three cases in an exponential function: the blue is where r is positive, and the population is growing, the red is where r is zero and the population stays the same size, and the green is where r is negative and the population is decreasing in size (Sharov).      The second case of growth for organisms is the K-strategist model.  This model, so called because K stands for the Carrying Capacity of the system, was developed by the Belgian Mathematician Pierre Verhulst in 1838 who brought forth the concept that the rate at which the population is growing may be limited by the density of the population.  The so-called Logistic model is defined by the differential equation:  dP/dt = r0\*P\*(1-P/K)    In this model, there are three outcomes.  The blue is where the initial population, P0 is greater than the Carrying Capacity.  It swiftly drops down the population size to reach the carrying capacity.  The second outcome is where P0 equals the carrying capacity.  In this case, nothing happens, because any rise or fall in population is going away from the carrying capacity, which the equation wants to converge to.  The final outcome, in the green, is where P0 is less than the carrying capacity, and it moves upwards to reach the carrying capacity level.  The logistic model has two equilibria in its system: when P is equal to 0 and when P is equal to the carrying capacity (Hitt).  Once it reaches either, it will stay there unless the population is upset by, say, a natural disaster.  [prev]|[[next](http://docs.google.com/intro2.htm)] |  |
|  |  |  |  |  |  |
|  | | | | | |