Study Guide: Biology in Focus, 2nd Edition **Chapter 40**

POPULATION ECOLOGY AND THE DISTRIBUTION OF ORGANISMS

SCIENTIFIC SKILLS EXERCISE:

Using the logistic equation to model population growth

What happens to the size of a population when it overshoots its carrying capacity?



Background: In the logistic population growth model, the per capita rate of population increase approaches zero as the population size (N) approaches the carrying capacity (K). Under some conditions, however, a population in the laboratory or the field can overshoot K, at least temporarily. If food becomes limiting to a population, for instance, there may be a delay before reproduction declines, and N may briefly exceed K. Use the logistic equation to model the growth of the hypothetical population in Table 40.2 when N > K.

Table 40.2Logistic Growth of a Hypothetical Population $(K = 1,500)$					
	Intrinsic Pate of		Per Capita Rate of Increase	Population Growth Rate*	
Population Size (<i>N</i>)	Increase (<i>r</i>)	$\frac{K-N}{K}$	r <u>(K – N)</u> K	$rNrac{(K-N)}{K}$	
25	1.0	0.983	0.983	+ 25	
100	1.0	0.933	0.933	+ 93	
250	1.0	0.833	0.833	+ 208	
500	1.0	0.667	0.667	+ 333	
750	1.0	0.500	0.500	+ 375	
1,000	1.0	0.333	0.333	+ 333	
1,500	1.0	0.000	0.000	0	
*Rounded to the nearest whole number.					

Study Guide: Biology in Focus, 2ND Edition **Chapter 40** Population Ecology and the Distribution of Organisms