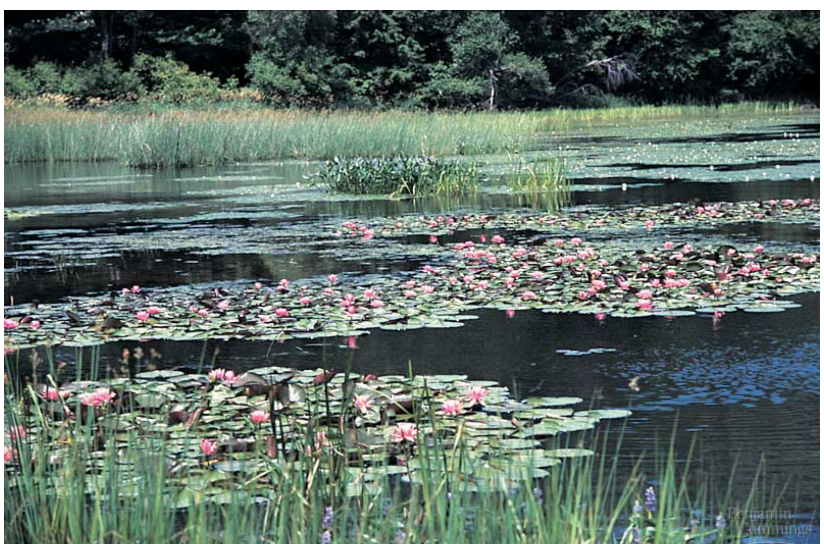
4. Effects of population structure on dynamics

- a. Sex ratio
- b. Age structure
- c. Life tables
- d. Life history
  - 1) Survivorship patterns
  - 2) Age-specific birth rates
  - 3) Life history diversity



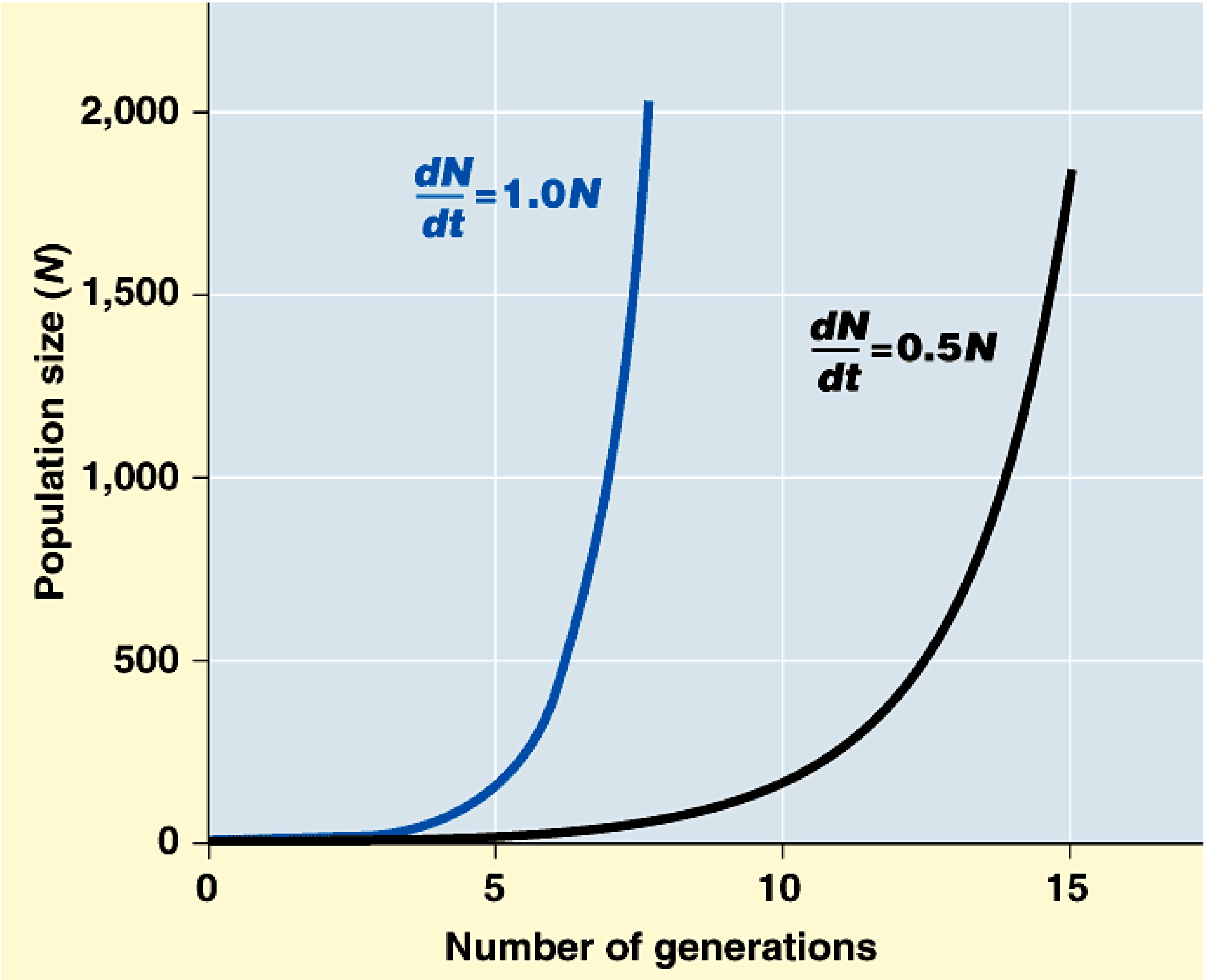
Ecology

the study of the distribution and abundance of organisms

$$dN/dt = rN$$

$r > 0$	population will grow
$r = 0$	population won't change
$r < 0$	population will shrink

Fig. 52.8 The exponential model for population growth



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

$dN/dt = r N [(K - N)/K]$

For: $r=0.1$ $K=100$

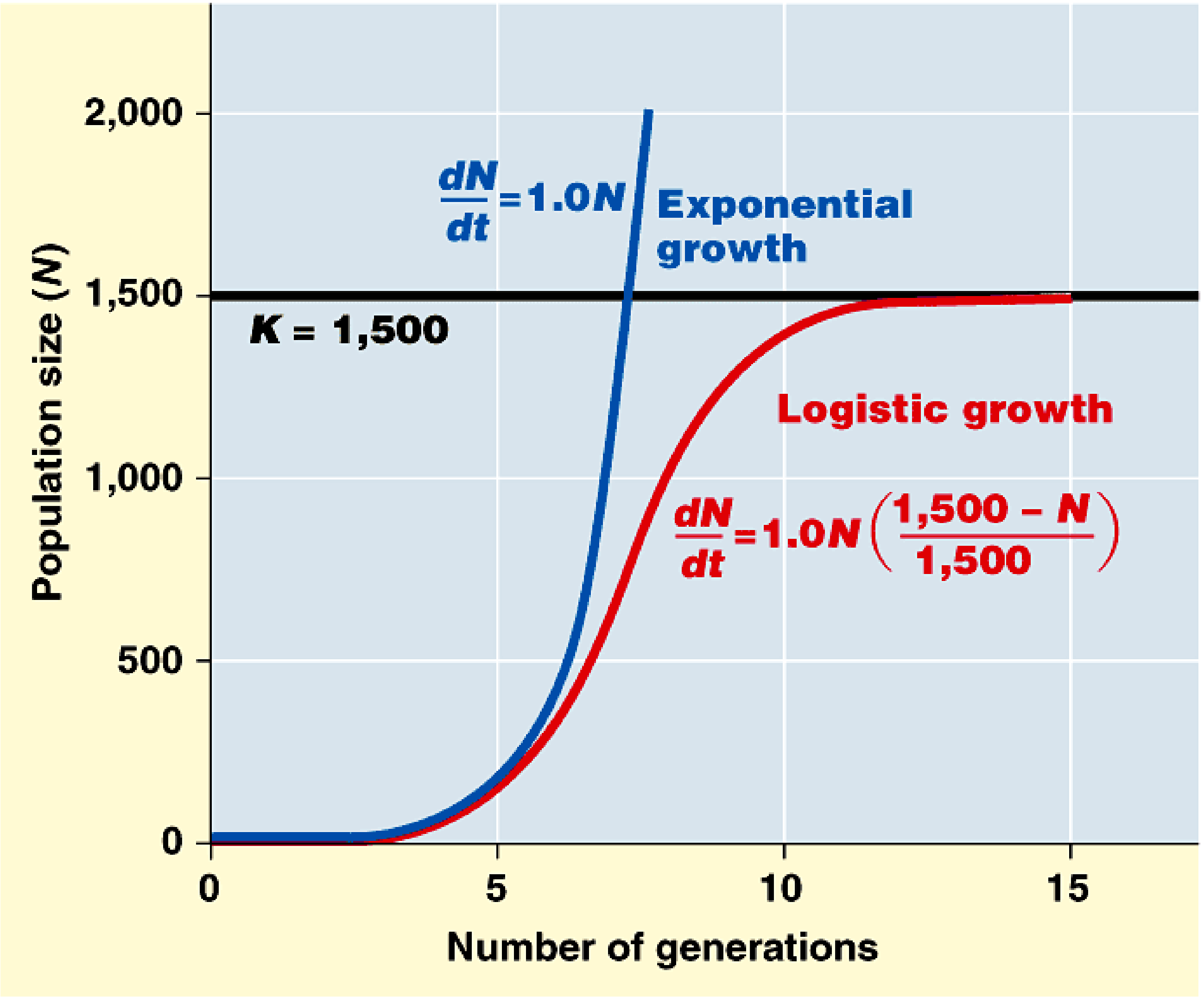
if $N = 10$

$$dN/dt = .1 (10) [(100 - 10)/100] = .1 (10) (.9) = .9$$

if $N = 99$

$$dN/dt = .1 (99) [(100 - 99)/100] = .1 (99) (.01) = .099$$

Fig. 52.11 The patterns of exponential and logistic population growth



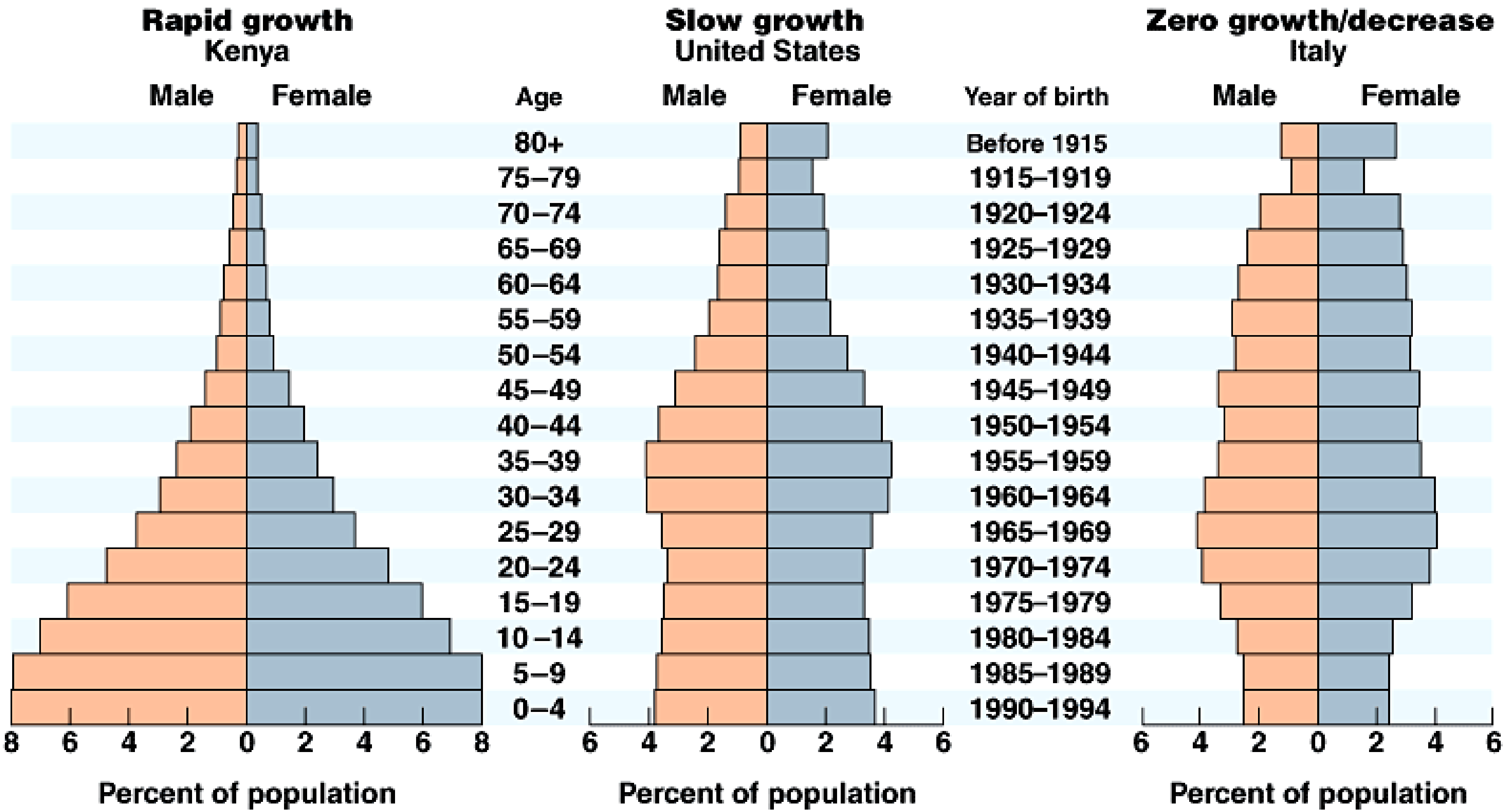
Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

What do I need to know about these models?

	Exponential	**Logistic**
Pattern:	J-shaped	S-shaped
Equation*:	$dN/dt = rN$	$dN/dt = rN[(K-N)/K]$
Assumptions:	-growth rate constant	growth rate decreases with pop size
	-unlimited env.	carrying capacity

* Know what each term means and how changes in the terms affect the pattern of population growth.

Fig. 52.22



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

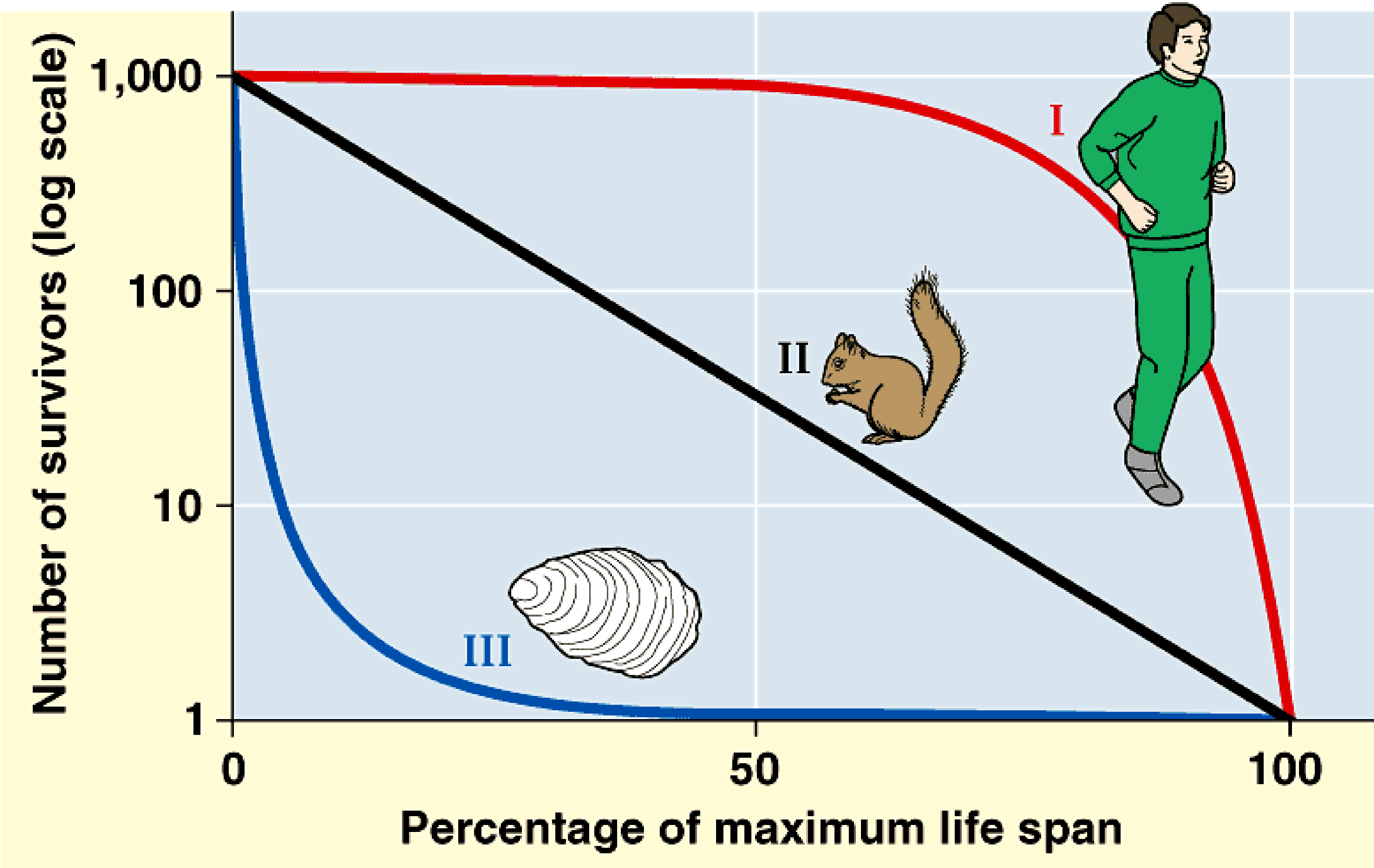
A Life Table

Age	Number aged x	Probability of survival to x	#Offspring born to females aged x
0	600	1.0	0
1	300	0.5	0
2	240	0.4	2
3	60	0.1	3
4	30	0.05	5

A model for growth of an age-structured population:

$N_{t+1} / N_t = \Sigma$ (probability of survival to x)(#offspring at x)

Fig. 52.3



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Variation in life history among plants

Live long, reproduce once and die

Live not so long, reproduce early

Live long, begin reproduction late