

Read pgs. 584-587 Do Q# 1 pg. 592

Section 12.1 Questions, page 592

1. (a) Dispersion may be random, uniform, or clumped.

(b) Answers may vary. Sample answer: No, population dispersion patterns vary through time in response to the supply of resources and seasonal habitat changes.

Read pgs. 584-587 Do Q# 1 pg. 592

5. Answers may vary. Sample answer: Could the earth's resources sustain such a population? If not, how large a human population can live decently on this planet? What steps can we take now to avoid growing beyond our carrying capacity?

6. (a) **Given:** initial population, $N_1 = 650$
intrinsic growth rate, $r = 0.450/\text{day}$

Required: initial instantaneous growth rate

Analysis: initial instantaneous growth $= r \times N$

Solution: Calculate the initial instantaneous growth.

$$\begin{aligned}\text{initial instantaneous growth} &= r \times N \\ &= r \times N \\ &= (0.450/\text{day}) \times (650)\end{aligned}$$

$$\text{initial instantaneous growth} = 292.5$$

Statement: When the population size is 650, the initial instantaneous growth rate is 292.5 individuals per day.

(b) **Given:** intrinsic growth rate, $r = 0.450/\text{day}$

Required: doubling time, t_d

Analysis: $t_d = 0.69 \div r$

Solution: Calculate the time it will take for the population to double in size.

Use the following formula:

$$\begin{aligned}t_d &= 0.69 \div r \\ &= 0.69 \div (0.450/\text{day}) \\ &= 1.533 \text{ day}\end{aligned}$$

Statement: The mosquito population will double in size every 1.533 days.

(c) The population of mosquitoes will exceed 1 000 000 after 11 doubling periods, where the population will be $1\,331\,200$, $N_1 \times 2^P$. This represents 16.8 days, $t_d \times P$.