Name _____ Date _____

Population Growth Quick Check: Why Many Populations Grow Fast and Then Level Off

Directions: Answer each of the eight questions about population growth. The last group of questions uses a table of duckweed counts.

1. A few rabbits are released on an island with plenty of food and no predators, and for several years their number roughly doubles each year. Which statement best describes this growth?

A. It is exponential growth, which cannot go on forever because the island's resources are limited.

B. It is logistic growth, because the population is already holding steady at its carrying capacity.

C. It is exponential growth, which will go on forever because rabbits reproduce so quickly.

D. It is not population growth at all, since only the number of births is changing each year.

2. What is the carrying capacity of an environment for a population?

A. The greatest number of young that one female can produce in her lifetime

B. The total number of individuals that could ever be born there in one year

C. The number of individuals in the population on the first day it is counted

D. The largest population the environment can support over the long term

3. For a population of field mice, which two of these are density-independent limiting factors?

☐ A. A flood that drowns mice in their burrows across the field

☐ B. A disease that spreads faster when the mice live close together

☐ C. A late spring snowstorm that kills many mice across the field

☐ D. Competition for seeds that grows fiercer as the mice become crowded

☐ E. Owls that hunt more often in parts of the field with many mice

4. Why do density-dependent factors tend to keep a population near its carrying capacity?

A. Their effects are the same for a population of ten individuals as for one of ten thousand.

B. They act only on small populations, which pushes those populations to grow larger and larger.

C. They make a population grow faster and faster the more crowded it becomes over time.

D. Their effects grow stronger as the population gets more crowded and weaken when it is small.

Duckweed in Four Tanks

In an investigation, 20 duckweed fronds were placed in each of 4 identical tanks of pond

water. Light and temperature were kept the same, and fresh nutrients were added each week so they would not run out. Fronds were counted every 3 days, and each value is the mean for the 4 tanks.

Mean number of duckweed fronds in 4 tanks over 24 days (a frond is one small, leaflike floating part of the plant)

Day	Mean number of fronds per tank
0	20
3	38
6	74
9	140
12	250
15	380
18	470
21	505
24	515

5. Between which two counts did the mean number of fronds increase the most?

A. Day 12 and day 15
B. Day 21 and day 24
C. Day 0 and day 3
D. Day 9 and day 12

6. Which kind of growth do the counts in the table fit best?

A. Logistic growth: fast increases at first, then smaller ones as the counts leveled off
B. A crash: the mean number of fronds rose quickly and then fell sharply after day 15
C. Exponential growth: each 3-day increase was larger than the one before, right up to day 24
D. No growth: the mean number of fronds stayed about the same from day 0 to day 24

7. Based on the table, about what is the carrying capacity of one tank for duckweed under these conditions?

A. About 130 to 150 fronds
B. About 1,000 to 1,100 fronds
C. About 500 to 520 fronds
D. About 240 to 260 fronds

8. Nutrients were added each week, and light and temperature stayed the same. What most likely slowed the duckweed's growth after day 15?

A. Running out of nutrients, since the duckweed used them up faster than they were added
B. A cold spell, since lower temperatures slow growth in every tank by the same amount
C. Crowding, as fronds covered more of the water's surface and shaded one another
D. The fronds sensing that the tank looked full and choosing to stop making new fronds