Supplemental Test Items to accompany OpenStax College *Concepts of Biology*. Note that not all chapters of OpenStax College *Concepts of Biology* have accompanying test items. Building on the community-oriented nature of OpenStax College resources, we invite you to submit items to be considered for future inclusion.

**Chapter 19: Population and Community Ecology**

1. The study of the interactions of living organisms with their environment is called what? (Outcome #7a) (DOK 1)
   1. ecology\*
   2. ethology
   3. taxonomy
2. Ecologists are chiefly concerned with the \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ of living things in the environment. (Outcome #7a) (DOK 1)
   1. ancestry, similarities
   2. distribution, abundance\*
   3. cells, molecules
3. Which of the three lists of levels of life below is specific to ecological investigation? (Outcome #7a) (DOK 1)
   1. species, genus, family, order
   2. molecules, organelles, organs, cells
   3. organism, population, community, ecosystem\*
4. Choose the best definition of biosphere. (Outcome #7a) (DOK 1)
   1. all of the ecosystems on the planet\*
   2. all of the communities in an ecosystem
   3. all of the ecosystems in a biome
5. The American Bald Eagle was on the Endangered Species list for many years, the bird’s numbers have rebounded considerably. Study of these birds occurs at what level? (Outcome #7a) (DOK 1)
   1. ecosystem ecology
   2. population ecology\*
   3. community ecology
6. The Karner blue butterfly lays its eggs on wild lupine plants. When the larvae hatch, they feed exclusively on the wild lupine. A study of this interaction occurs at what level of ecology? (Outcome #7a) (DOK 1)
   1. population ecology
   2. ecosystem ecology
   3. community ecology\*
7. Members of the same species within a community are called what? (Outcome #7a) (DOK 1)
   1. conspecifics\*
   2. heterospecifics
   3. homospecifics
8. The monarch butterfly lays its eggs on milkweed plants, and the milkweed-monarch interaction illustrates the principles of organismal ecology. Why? (Outcomce #7a) (DOK 3) (Paired Item 1)
   1. The milkweeds contain toxins that keep predators of the monarchs away from the eggs; once hatched, the larvae leave the milkweeds for nearby plants.
   2. The monarchs fertilize the milkweed flowers, and the milkweed protects their eggs from wasps and bees.
   3. The larvae that hatch feed exclusively on milkweed plants, so monarchs rely on the presence of milkweeds to reproduce.\*
9. Which of the following best represents the principles of organismal ecology? (Outcome #7a) (DOK 3) (Paired Item 2)
   1. The monarch butterfly exists as a caterpillar larval stage that only feeds on milkweeds, so the butterfly depends on milkweed populations to reproduce.\*
   2. Milkweeds rely on monarch butterflies for pollination, so milkweeds will only grow where monarch butterflies exist.
   3. Milkweeds produce glycoside toxins which keep monarchs and other pests from feeding on them.
10. Ecologists use a method of studying a particular population of animal within a community called “mark and recapture.” A researcher captures, marks, and releases 40 red fox into a large community. He then collects 100 different red fox over the next year. If the recapture rate is 10%, what is a reasonable estimate of the red fox population size? (Outcome #7a) (DOK 3) (Paired Item 1)
    1. 40
    2. 400\*
    3. 4000
11. Mark and recapture is a way that ecologists can estimate the size of a population in a community or ecosystem. A researcher team recently captured, tagged, and released 50 crows in one geographic region. Then over the next few months, they captured 200 crows, of which 5% were tagged from before. They conclude that the population of crows in this region is roughly\_\_\_\_\_\_\_\_\_. (Outcome #7a) (DOK 3) (Paired Item 2)
    1. 100,000
    2. 10,000
    3. 1000\*
12. Select the best definition of the term demography. (Outcome #7b) (DOK 1) (Paired Item 1)
    1. the statistical study of population dynamics\*
    2. the statistical study of population characteristics
    3. the qualitative study of ecosystem diversity
13. The quantitative study of changes in populations is called what? (Outcome #7b) (DOK 1) (Paired Item 2)
    1. demography\*
    2. democracy
    3. archaeology
14. What are the two primary parameters used to describe a population within a given habitat at a given point in time? (Outcome #7b) (DOK 1)
    1. population range and life expectancy
    2. population size and density\*
    3. population birth and death rates
15. If a population exhibits a death rate that exceeds its birth rate, it is likely to \_\_\_\_\_\_\_\_. (Outcome #7b) (DOK 1)
    1. remain constant in size
    2. increase in size
    3. decrease in size\*
16. Animal species that exhibit long gestation periods, give birth to relatively large offspring, and maintain population numbers close to the habitat carrying capacity are called \_\_\_\_\_\_\_ species. (Outcome #7b) (DOK 1) (Paired Item 1)
    1. K-selected\*
    2. r-selected
    3. unselected
17. Designating a species a K-selected species means that the species likely exhibits which set of characteristics? (Outcome #7b) (DOK 1) (Paired Item 2)
    1. long gestation, small birth number, large offspring, late maturation\*
    2. short gestation, large birth number, small offspring, early maturation
    3. lays eggs instead of giving live birth, has short life span, type II survivorship curve
18. The principle that states that two different species cannot occupy the same niche in a given habitat is called what? (Outcome #7b) (DOK 1)
    1. Pauli exclusion
    2. competitive exclusion\*
    3. mutual exclusion
19. Commensal symbiosis is an interaction between two species best described how? (Outcome #7b) (DOK 1)
    1. One species benefits from the interaction at a cost to the other species.
    2. Both species benefit from the interaction.
    3. One species benefits from the interaction, and the other is unaffected.\*
20. How is the mass of an individual organism generally related to the organism’s population density? (Outcome #7b) (DOK 2) (Paired Item 1)
    1. inversely proportional
    2. directly proportional
    3. inversely exponential\*
21. As the individual body size of an organism increases, the population density for this organism in a given habitat tends to \_\_\_\_\_\_\_. (Outcome #7b) (DOK 2) (Paired Item 2)
    1. decrease exponentially\*
    2. decrease proportionally
    3. increase exponentially
22. A field ecologist is studying a sage plant (Salvia leucophylla) that grows wild in Southern California. She notices the characteristic uniform dispersion of the plants in all of the quadrats she has mapped out. This dispersion pattern tends to occur because\_\_\_\_\_\_\_. (Outcome #7b) (DOK 2) (Paired Item 1)
    1. this plant drops its relatively heavy seeds straight to the ground immediately around it
    2. this plant secretes a chemical that inhibits the growth of nearby plants\*
    3. this plant relies on wind to disperse it’s relatively lightweight seeds
23. The sage plant Salvia leucophylla secrets a chemical that inhibits the growth of other sage plants nearby. Considering this, what is the most likely pattern of dispersion one would find in the plant’s natural habitat? (Outcome #7b) (DOK 2) (Paired Item 2)
    1. random
    2. uniform\*
    3. clumped
24. The life table data for the Dall mountain sheep indicate that at age 7–8 years, 69 sheep per 1,000 sheep will die while 640 per 1,000 sheep will survive into the next year. What is the mortality rate (per 1,000) for this age group? (Outcome #7b) (DOK 3)
    1. 0.108
    2. 97.3
    3. 107.8\*
25. What can one infer from a relatively linear survivorship curve, and what organism generally exhibits this kind of survivorship curve? (Outcome #7b) (DOK 3) (Paired Item 1)
    1. the mortality rate is roughly uniform across the lifespan of this organism; birds\*
    2. the mortality rate is higher for older members of this population; humans
    3. the mortality rate is higher for younger members of this population; oak trees
26. A population—birds, for example—that experiences a roughly uniform mortality rate across its lifespan will typically exhibit what type of survivorship curve? (Outcome #7b) (DOK 3) (Paired Item 2)
    1. Type II, linear\*
    2. Type I, convex
    3. Type III, concave
27. All of the organisms living together in a particular habitat and their interactions with their non-living environment are called: (Outcome #8) (DOK 1)
    1. communities
    2. ecosystems\*
    3. populations
28. With a typical predator and prey, when the prey population increases, (Outcome #8) (DOK 1)
    1. the predator population decreases
    2. the predator population remains stable
    3. the predator population increases\*