

Topic 9

Level 1

1. C
2. D
3. D
4. A
5. D
6. A
7. B
8. D
9. C
10. D
11. B
12. B
13. D
14. B
15. A
16. C
17. C
18. D
19. C
20. D
21. C
22. C
23. C

Level 2

1. B
2. B
3. C
4. C
5. D
6. C
7. B
8. B
9. B
10. D
11. A
12. D
13. C
14. B
15. C
16. A
17. B

- 18. D
- 19. B
- 20. A
- 21. A
- 22. D
- 23. D
- 24. C

GRID IN

- 1. 302.4
- 2. 52.5

Free response question

(C) is correct. Homeostasis is the ability of an organism to maintain its internal environment. In case C, the body fails to maintain its internal environment within narrow limits. All the other choices describe events that occur when the body is outside normal homeostatic bounds with regard to

1. **The answer is 302.4 L.** One way to solve this is the number of beats per minute times 60 minutes per hour ($72 \times 60 = 4,320$ heartbeats per hour), then multiply that by 70 mL per beat ($4,320 \times 70 = 302,400$) and convert to liters by dividing by 1000 to give 302.4 L/hour!
2. **The answer is 52.5 mm Hg.** The peak has a partial pressure of oxygen ($510 \times 0.21 = 107.1$ mm Hg) of 107.1 mm Hg. Subtracting that from the sea level value of 159.6 mm Hg, the final answer is 52.5 mm Hg, or about one-third the amount of oxygen at sea level. Did you remember to find the *difference*? Be sure to read the questions carefully.

on

- a) Innate behaviors are behaviors that are not learned but genetically programmed. An example of an innate behavior would be when birds begin migration based on day length cues. This behavior enhances survival because the changes in day length correlate to seasonal changes in food supplies and place the birds in habitats with more food for survival and reproduction.
- b) An example of a learned behavior would be the species-specific song of a bird. It is learned during a critical period by imprinting. If a bird is fostered by another species, it may learn the song of the foster species. Because the song is important to attract mates, failure to learn the species-specific song limits reproductive success.
- c) Cooperative behavior is seen in colonial insects such as bees. A reproductive female produces all the eggs, nonreproductive females tend the larvae and

obtain food for the group, and the males mate with the queen. The needs of the entire population are met through this cooperative behavior. As an example, the worker bees will fan their wings to cool the hive, and this cooperative behavior ensures survival of the entire group.

- (d) Pheromones are one type of chemical signal. Termites will deposit a pheromone trail that other blind members of the colony will follow to locate a food supply. This behavior is adaptive because it enables the entire colony access to a resource. One worker may stumble upon the resource and be able to deposit this chemical trail that leads others to the source.

This question could have been answered with many different examples; what is important to note is that the student not only provided a description of the behavior in a particular species, but carefully explained how the behavior increased survival. Be careful to always follow directions! Many students would answer this question with great examples, but then forget to relate this behavior to natural selection.

Topic 10: Ecology

EXPLANATIONS

Comprehension Questions

1. (C) is correct. The ozone layer is located in the stratosphere and surrounds Earth. It is composed of O_3 , and it absorbs UV radiation, reducing the level of UV radiation reaching the organisms in the biosphere. Researchers have been observing the thinning of the ozone layer since about 1975. One reason for the destruction of the ozone layer has been attributed to the widespread use of chlorofluorocarbons.
2. (B) is correct. The carrying capacity of a population is defined as the maximum population size a particular environment can support at a particular time with no degradation of the habitat. It is fixed at certain times, but it varies over the course of time with the amount of resources that exist in an environment.
3. (C) is correct. Tundra is characterized by having permafrost (which is a permanently frozen layer of soil), very cold temperatures, and high winds.