

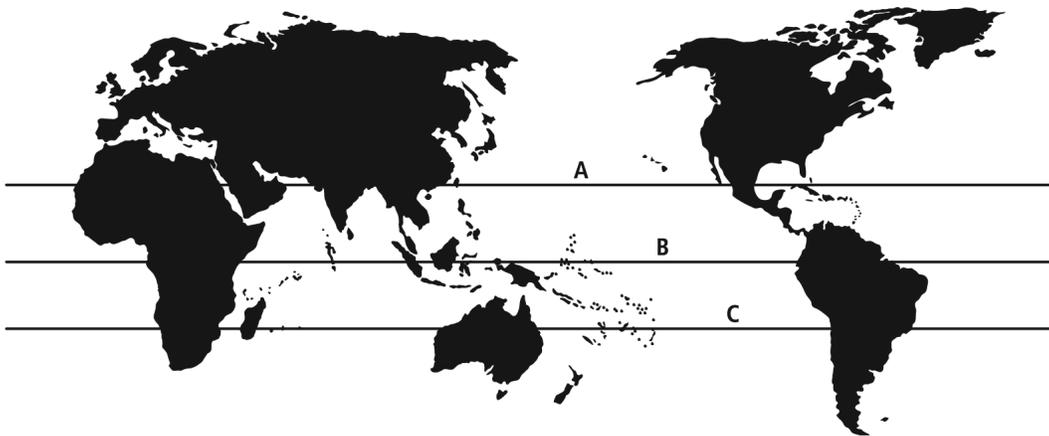
Name: \_\_\_\_\_

Date: \_\_\_\_\_

Choose the letter of the best answer.

- \_\_\_\_ 1. Animals cannot grow without  
A. nutrients  
B. soil  
C. shrubs  
D. roots
- \_\_\_\_ 2. Which resource do green plants need in order to make sugars?  
A. fungi  
B. seeds  
C. bees  
D. sunlight
- \_\_\_\_ 3. Animals get energy and matter by taking in  
A. food  
B. exercise  
C. sunlight  
D. oxygen
- \_\_\_\_ 4. The original source of energy in your food is  
A. plants  
B. animals  
C. sunlight  
D. bacteria
- \_\_\_\_ 5. Which of the following is an example of matter?  
A. sunlight  
B. sound  
C. water  
D. heat
- \_\_\_\_ 6. The natural world that surrounds an organism is called the organism's  
A. energy  
B. environment  
C. lodgings  
D. nutrients
- \_\_\_\_ 7. Which of the following best describes a system?  
A. many different parts functioning independently of each other  
B. many different parts interacting to form a whole  
C. a single object that has many different functions  
D. a single object that functions independently of other objects

Using the diagram, answer the following questions.



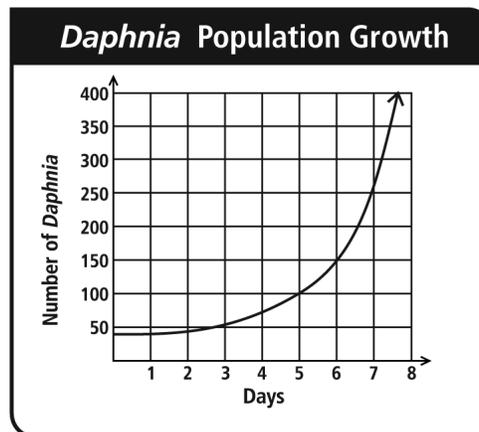
- \_\_\_\_ 8. The line labeled "B" is the  
A. Tropic of Cancer  
B. equator  
C. Tropic of Capricorn  
D. prime meridian
- \_\_\_\_ 9. The area between line A and line C is known as  
A. the temperate zone  
B. the poles  
C. the tropics  
D. the equatorial zone

Choose the letter of the best answer.

- \_\_\_\_ 10. Which of the following factors in an ecosystem is biotic?  
A. insects  
B. soil  
C. water  
D. sunlight
- \_\_\_\_ 11. Two abiotic factors that affect an ecosystem are  
A. temperature and animals  
B. plants and animals  
C. water and bacteria  
D. soil and water

- \_\_\_ 12. Which of the following is an ecosystem?  
 A. forest  
 B. microorganism  
 C. marine mammal  
 D. highway
- \_\_\_ 13. Which of the following is a biome?  
 A. meadow  
 B. lake  
 C. field  
 D. grassland
- \_\_\_ 14. How is a biome different from an ecosystem?  
 A. A biome is local, and an ecosystem is worldwide.  
 B. A biome contains living and nonliving factors.  
 C. A biome covers a smaller area than an ecosystem.  
 D. A biome is made up of similar ecosystems.
- \_\_\_ 15. Two examples of decomposers are  
 A. fungi and bacteria  
 B. algae and marine mammals  
 C. carnivores and herbivores  
 D. ferns and mosses
- \_\_\_ 16. A caterpillar eats a leaf, and a bird eats the caterpillar. In this interaction, the bird is a  
 A. producer  
 B. herbivore  
 C. primary consumer  
 D. secondary consumer
- \_\_\_ 17. How is a food web model different from a food chain?  
 A. In a web, energy moves from an organism to only one other.  
 B. In a web, energy may move to many organisms from one.  
 C. In a web, an organism gets energy from one source.  
 D. In a web, an organism receives less energy than in a chain.
- \_\_\_ 18. All the living things in a meadow and the physical environment around them make up the meadow's  
 A. community  
 B. population  
 C. ecosystem  
 D. niche
- \_\_\_ 19. Combustion, photosynthesis, and respiration are processes that cycle \_\_\_\_\_ through the environment.  
 A. carbon  
 B. water  
 C. nitrogen  
 D. phosphorus
- \_\_\_ 20. A crab lives on a beach where it gets food, shelter, and space to live. The beach is the crab's  
 A. niche  
 B. community  
 C. habitat  
 D. home
- \_\_\_ 21. Algae continue to grow and multiply in a lake until there are no more nutrients in the water. Nutrient availability is a \_\_\_\_\_ for the algae.  
 A. habitat  
 B. niche  
 C. carrying capacity  
 D. limiting factor
- \_\_\_ 22. The maximum population that an environment can support is called its  
 A. carrying capacity  
 B. pioneer species  
 C. ecosystem capacity  
 D. holding capacity

Using the graph, answer the following questions.



- \_\_\_ 23. On Day 6, the population of *Daphnia* is about  
 A. 400 organisms  
 B. 50 organisms  
 C. 150 organisms  
 D. 75 organisms

- \_\_\_\_ 24. What happens to the *Daphnia* population over the eight days shown on the graph?
- A. It increases.
  - B. It decreases.
  - C. It increases and then decreases.
  - D. It decreases and then increases.

**Extended Response**

Answer the following questions on the back of this paper or on a separate sheet of paper. (6 points each)

25. **Analyzing** Spraying insecticides in a garden can kill both harmful insects and helpful insects that feed on the harmful ones. The harmful insects may then cause more damage. Explain why. Use the terms *predator*, *prey*, and *population*.

## Answer Sheet

1. **A.** nutrients
2. **D.** sunlight
3. **A.** food
4. **C.** sunlight
5. **C.** water
6. **B.** environment
7. **B.** many different parts interacting to form a whole
8. **B.** equator
9. **C.** the tropics
10. **A.** insects
11. **D.** soil and water
12. **A.** forest
13. **D.** grassland
14. **D.** A biome is made up of similar ecosystems.
15. **A.** fungi and bacteria
16. **D.** secondary consumer
17. **B.** In a web, energy may move to many organisms from one.
18. **C.** ecosystem
19. **A.** carbon
20. **C.** habitat
21. **D.** limiting factor
22. **A.** carrying capacity
23. **C.** 150 organisms
24. **A.** It increases.
25. Extended Response Rubric  
6 points for a response that correctly answers both questions and uses all three terms accurately  
*Sample: Harmful insects can be preyed upon by helpful insect predators. Spraying insecticides could kill off both helpful predator and harmful prey species in the garden. The harmful population could grow back faster than the helpful population. With few helpful insects to eat harmful insects, the harmful population could grow larger than before the spraying took place. Attracting helpful predator insects to the garden could help keep the harmful prey population from growing quickly. Slower growth of the harmful species may prevent garden plants from being damaged.*  
5 points: correctly answers both questions and uses two terms accurately  
4 points: correctly answers both questions and uses one term accurately  
3 points: correctly answers one question and uses two terms accurately  
2 points: correctly answers one question and uses one term accurately  
1 point: correctly answers one question or uses one term accurately

## Standards Summary

NSES C.4.a	A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.
NSES C.4.b	Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some micro-organisms are producers-they make their own food. All animals, including humans, are consumers, which obtain food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.
NSES C.4.c	For ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.
NSES C.4.d	The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. Given adequate biotic and abiotic resources and no disease or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.
OH ES.C.7.8	Describe how temperature and precipitation determine climatic zones (biomes) (e.g., desert, grasslands, forests, tundra and alpine).
OH LS.C.6.8	Describe how organisms may interact with one another.
OH LS.C.7.2	Investigate how organisms or populations may interact with one another through symbiotic relationships and how some species have become so adapted to each other that neither could survive without the other (e.g., predator-prey, parasitism, mutualism and commensalism).
OH LS.C.7.3	Explain how the number of organisms an ecosystem can support depends on adequate biotic (living) resources (e.g., plants, animals) and abiotic (non-living) resources (e.g., light, water and soil).
OH LS.C.7.7	Explain that photosynthetic cells convert solar energy into chemical energy that is used to carry on life functions or is transferred to consumers and used to carry on their life functions.
OH LS.C	Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment.
OH LS.D.7.4	Investigate how overpopulation impacts an ecosystem.
OH LS.D.8.5	Investigate how an organism adapted to a particular environment may become extinct if the environment, as shown by the fossil record, changes.
OH LS.D	Explain how extinction of a species occurs when the environment changes and its adaptive characteristics are insufficient to allow survival (as seen in evidence of the fossil record).
OH SI.B.8.3	Read, construct and interpret data in various forms produced by self and others in both written and oral form (e.g., tables, charts, maps, graphs, diagrams and symbols).
P2061 4.D.6	There are groups of elements that have similar properties, including highly reactive metals, less-reactive metals, highly reactive nonmetals (such as chlorine, fluorine, and oxygen), and some almost completely nonreactive gases (such as helium and neon). An especially important kind of reaction between substances involves combination of oxygen with something else-as in burning or rusting. Some elements don't fit into any of the categories; among them are carbon and hydrogen, essential elements of living matter.

- P2061 5.D.1 In all environments-freshwater, marine, forest, desert, grassland, mountain, and others-organisms with similar needs may compete with one another for resources, including food, space, water, air, and shelter. In any particular environment, the growth and survival of organisms depend on the physical conditions.
- P2061 5.D.2 Two types of organisms may interact with one another in several ways: They may be in a producer/consumer, predator/prey, or parasite/host relationship. Or one organism may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other.
- P2061 5.E.1 Food provides molecules that serve as fuel and building material for all organisms. Plants use the energy in light to make sugars out of carbon dioxide and water. This food can be used immediately for fuel or materials or it may be stored for later use. Organisms that eat plants break down the plant structures to produce the materials and energy they need to survive. Then they are consumed by other organisms.
- P2061 5.E.3 Energy can change from one form to another in living things. Animals get energy from oxidizing their food, releasing some of its energy as heat. Almost all food energy comes originally from sunlight.