Name _____ Period _____
Due date _____

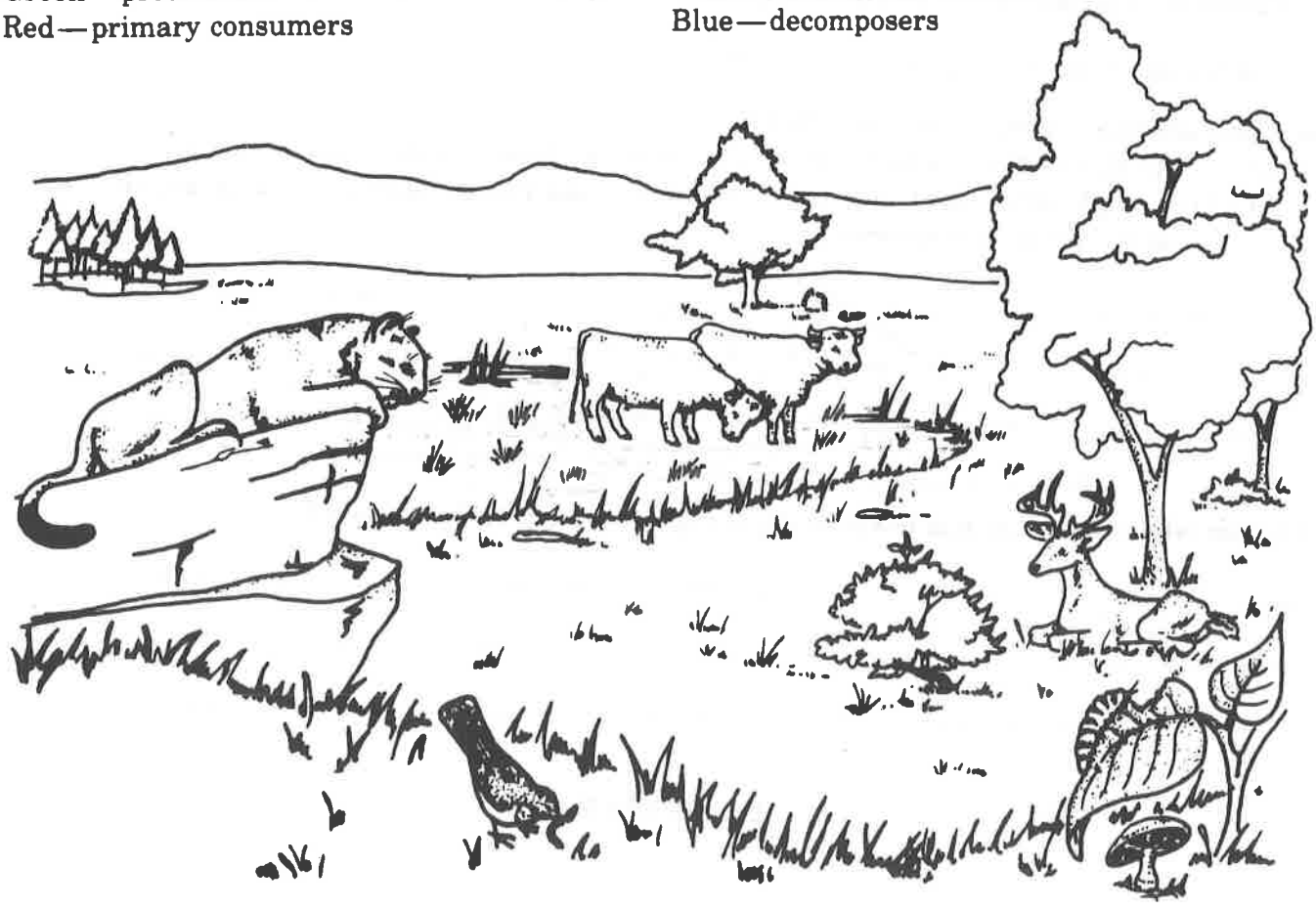
EXAMINING ECOLOGY

Ecology is the branch of biology that deals with the interactions between organisms and their environment. The population level includes all the members of one species. A community is composed of all the interaction populations in a given area. Ecosystems include communities and their non-living (abiotic) environments functioning together. All of the ecosystems on earth make up our biosphere. In this activity, you will examine some of the major concepts in ecology.

MATERIALS: Crayons (red, green, blue, yellow) Metric ruler

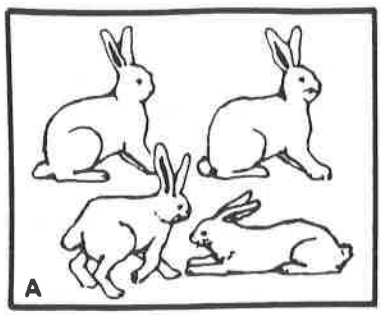
1. This picture of a community shows many different kinds of living things. Using these colors, shade the following parts.

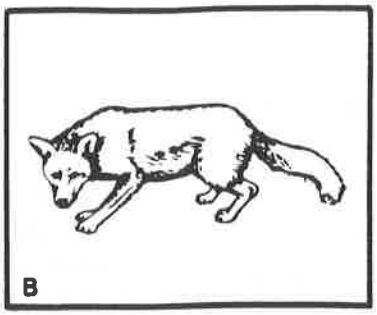
   Green—producers
   Red—primary consumers
   Yellow—secondary consumers
   Blue—decomposers

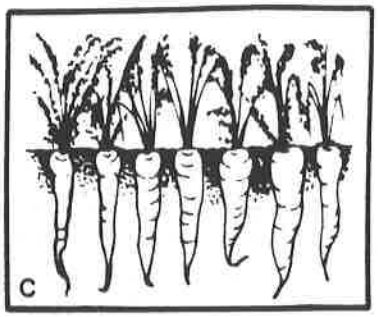


2. What is the habitat of the deer? _____
3. What is the niche of the deer? _____
4. List one decomposer in this community. _____
5. What producers are present in this community? _____
6. List two secondary consumers and tell what they eat. _____
   _____

ENERGY IN A COMMUNITY







1. Write the letter of the diagram above that best matches each of these words or phrases.

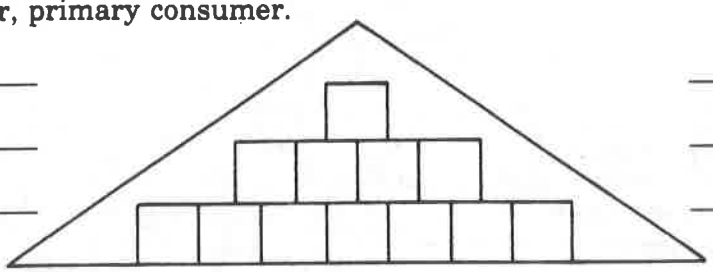
needs sun's energy to make food ____ producer ____

consumers ____ and ____ primary consumers ____

secondary consumer ____ gets the least energy available ____

2. a. Count the number of living things in each of the pictures above and record the numbers in the blanks. rabbits ____ foxes ____ carrots ____

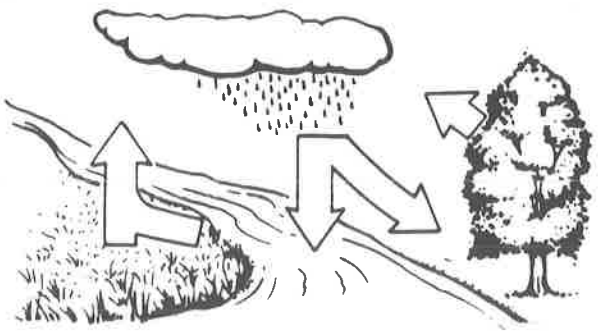
b. Complete the diagram below by following these steps.
1) On the blanks at the left, write the names of the living things in correct order.
2) On the right side, write each of these terms on the correct blank: producer, secondary consumer, primary consumer.



3. Explain why the picture has fewer living things at the top of the pyramid.

ECOSYSTEMS

1. The incomplete diagram below shows the water cycle. Complete the diagram by following these steps.



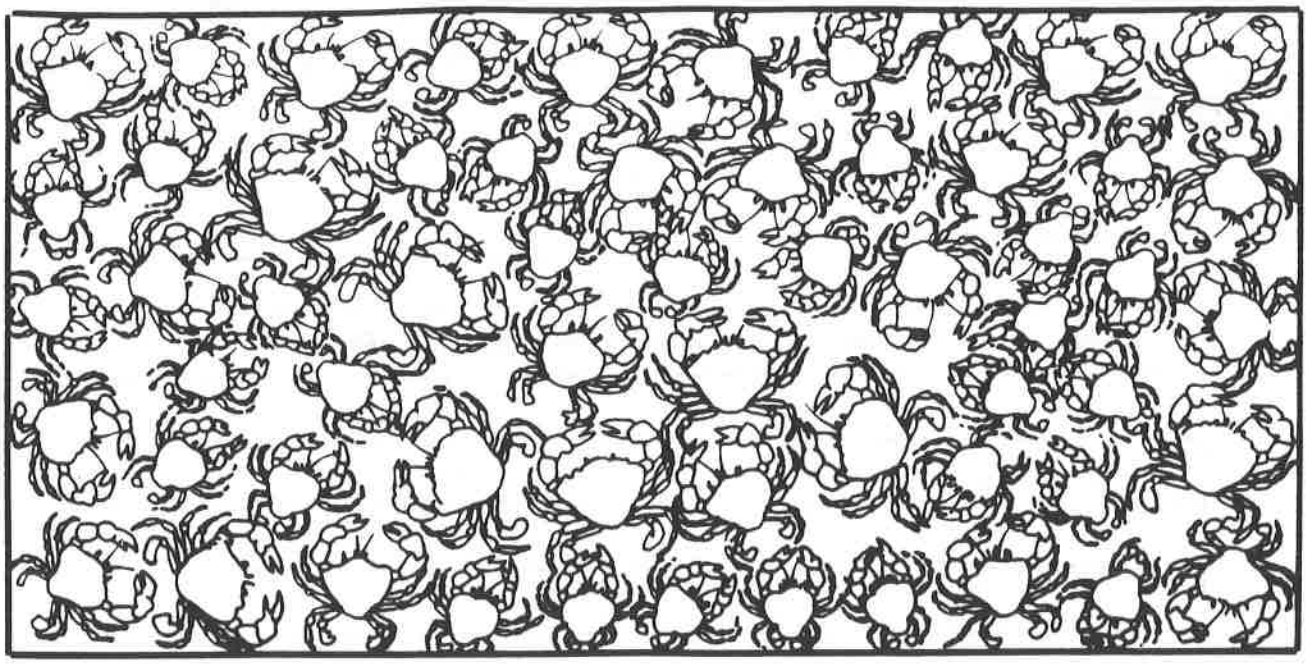
a. Use <u>blue</u> to shade the arrow that shows evaporation of water into air from ground or streams.

b. Use <u>green</u> to shade the arrow that shows evaporation of water into air from plants.

c. Use <u>red</u> to shade the arrow that shows precipitation.

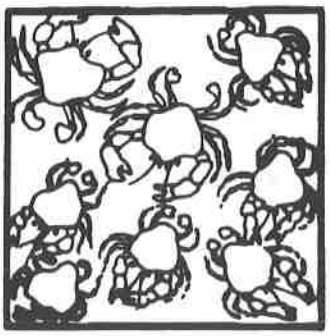
POPULATIONS

1. Make a population count of the crabs in the diagram below. Place a checkmark on the shell of each crab to avoid counting any twice. Keep track of how long it takes you to do it.



Total number = _____ Time it took = _____

2. A faster way to count a population is to sample it. Count the number of crabs in the small square on the right below.



Total number = _____

Time it took = _____

This square is ⅛ the size of the large square above. Therefore, you need to multiply the number you counted by 8 to get the total population size.

_____ × 8 = _____

3. **a.** Were the results from counting about the same regardless of which method was used to count?

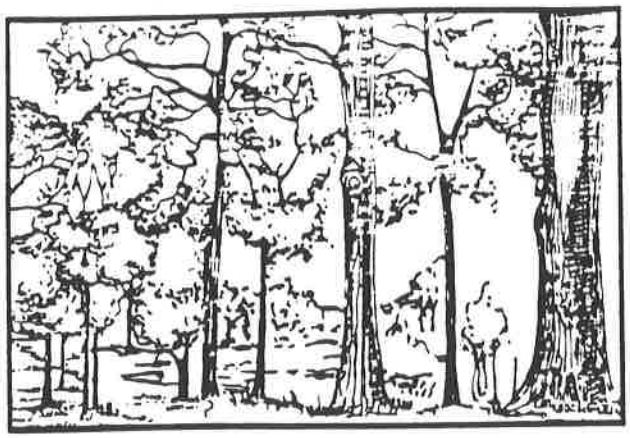
_____

b. What is the advantage of counting a population by sampling it? _____

_____

SUCCESSION

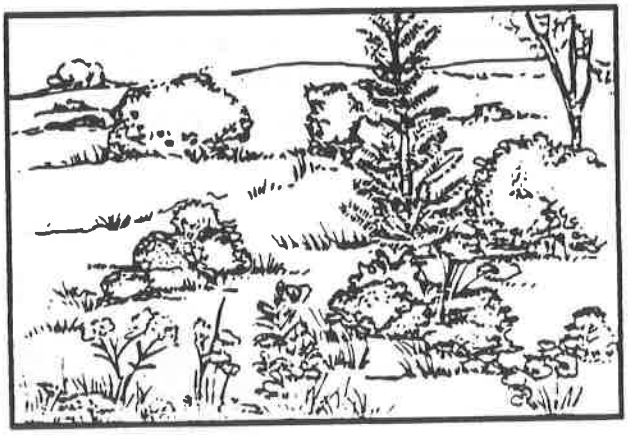
1. These diagrams of succession are not in the correct order. Show the correct order by writing the numbers 1 to 4 on the blanks below the diagrams.



_____

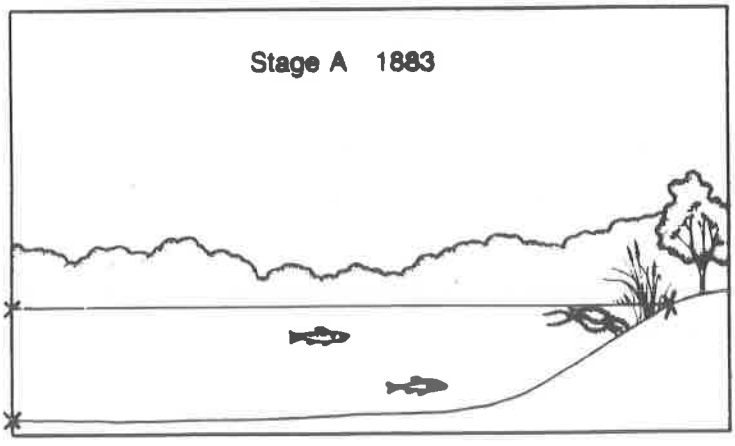
_____

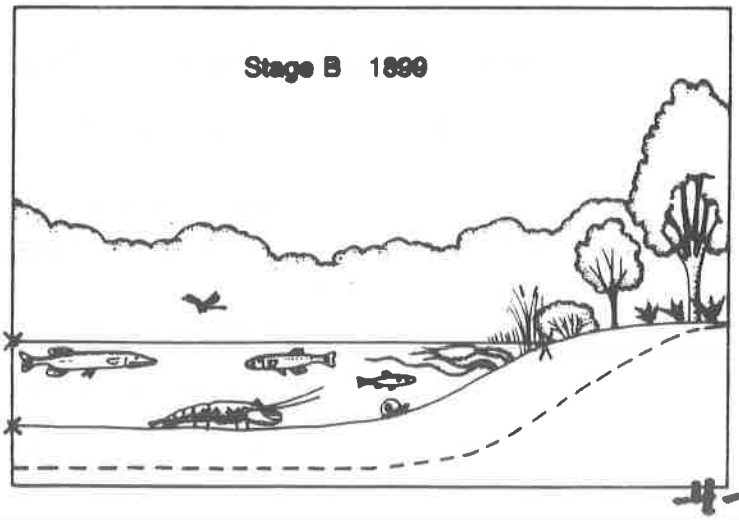
_____

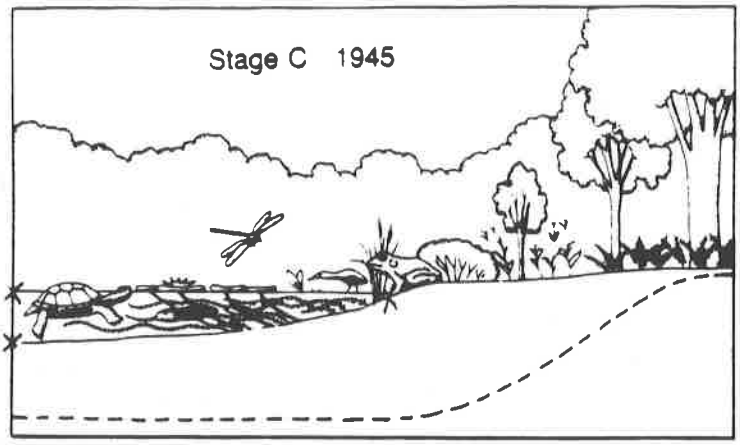


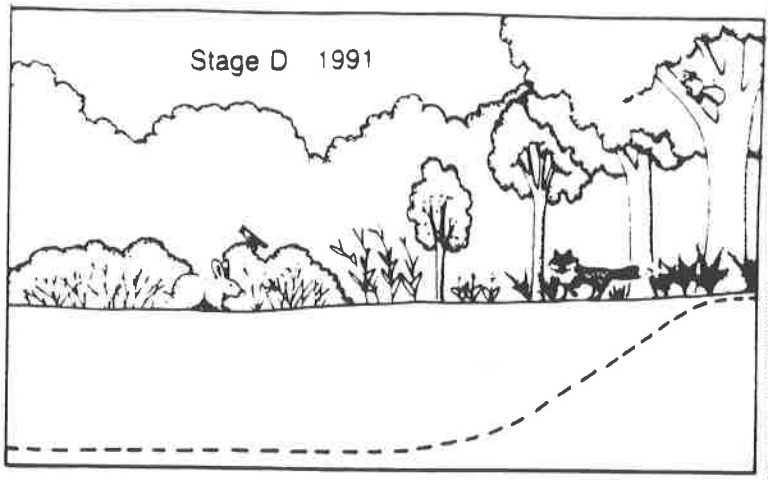
_____

3. Examine the diagrams below and the one on the next page. Measure the width and depth of the pond from the center of the X's in each diagram and record your measurements on the table on page 184. Then, answer the questions that follow.









Stage	Year	Pond depth (mm)	Pond width (mm)
A			
B			
C			
D			

4. Describe the changes that take place in pond depth and width as the pond ages. _____

_____

5. How have the numbers and types of animals changed from stage A to stage B? _____

_____

6. a. What has happened to the pond by stage C? _____

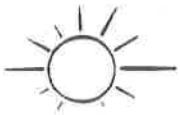
_____

b. How has this event affected the types of animals that are living in the pond? _____

_____

7. What has replaced the pond in stage D? _____

8. What word describes these changes in the pond? _____



Use the diagram on the left

____ The sun, tree, cow, and grass together represent a(an):

A. Population
B. Community
C. Ecosystem
D. Biosphere

1. Ecology can best be described as the study of

1 all the plants in a certain environment
2 living organisms and their environment
3 living factors that affect an organism
4 nonliving factors that affect an organism

2. A *biotic* factor in a snake's environment would be

1 sunlight
2 water
3 sand
4 a mouse

3. An *abiotic* factor in an eagle's environment would be

1 a tree
2 water
3 a snake
4 an insect

4. Light, temperature, and water are examples of environmental

1 habitats
2 niches
3 limiting factors
4 adaptations

5. Competition between organisms can best be described as an interaction in which the organisms

1 rely on the same resources
2 work together to find food
3 live in the same place but eat different food
4 eat the same food but live in different places

6. A frog's habitat would be the

1 pond it lives in
2 sounds it makes
3 insects it eats
4 color of its skin

7. An ecosystem is best described as the

1 type of food that an organism eats
2 type of home an organism builds
3 group of organisms in a particular place
4 living and nonliving factors in one place

8. The carrying capacity of an ecosystem describes the

1 total mass of the organisms in the ecosystem
2 size of a population that it can support
3 total amount of resources available
4 total number of populations present

9. The source of energy for most ecosystems is

1 rain
2 wind
3 flowing water
4 the sun

10. Although three different bird species inhabit the same type of tree in the same forest, there is very little competition among them. The most likely reason for this is that the birds

1 are unable to interbreed
2 have different ecological niches
3 have a limited supply of food
4 share food with each other

11. A parasitic relationship differs from a predator-prey relationship in that a

1 host organism is killed right away whereas prey is not
2 prey organism is killed right away whereas a host is not
3 parasite helps its host whereas a predator kills its prey
4 prey organism benefits whereas a parasite's host does not

12. The oxygen that humans breathe is actually

1 a waste product of respiration
2 a waste product of photosynthesis
3 given off by decomposers
4 produced within the sun

13. The tendency of an ecosystem to stay the same is called

1 diversity
2 resistance
3 stability
4 sterility

14. Over time, human populations have

1 produced fewer and fewer wastes
2 increased the amount of wastes produced
3 prevented harmful chemicals from being produced
4 decreased the amount of waste in landfills

15. The loss of biodiversity is often related to

1 the search for medical cures
2 too much rain in rain forests
3 a loss of natural habitat
4 evolution not occurring

16. A population can best be described as all of the

1 plants in a particular place
2 animals in a particular place
3 different organisms in one place at a particular time
4 organisms of one species in one place at a particular time

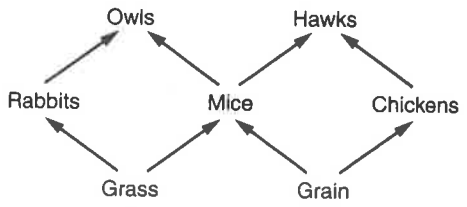
17. An example of a population in a lake is all of the

1 lake trout
2 lake trout and brown trout
3 plants and trout
4 soil, plants, and fish

18. A community can best be described as all of the

1 plant species in one particular place
2 organisms of one species in a particular place
3 populations that interact in a particular place
4 animals that interact in a particular place

Refer to the diagram below to answer questions 19 and 20.



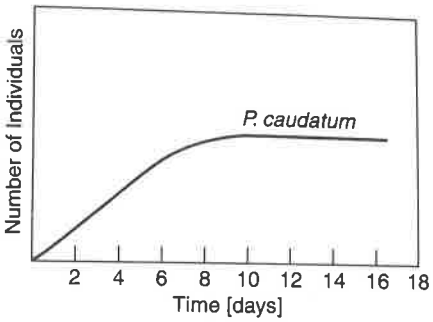
19. Based on the diagram, which of the following statements is true?

1 Rabbits and owls compete for grass.
2 Mice and chickens compete for grain.
3 Rabbits and chickens compete for grass.
4 Chickens and rabbits compete for grain.

20. Owls hunt at night, whereas hawks hunt during the day. This has the effect of

1 reducing competition for mice because the birds occupy separate forests
2 reducing competition for mice because the birds occupy separate niches
3 increasing competition for mice because the birds occupy the same niche
4 reducing competition for rabbits and chickens because the birds eat more mice

Refer to the figure below, which shows the growth curve of a population of Paramecium caudatum, to answer questions 21 to 22.



21. Why does the slope of the graph increase from the beginning to the middle?

1 The death rate begins to increase.
2 The growth rate slows after four days.
3 The population grows while it is below carrying capacity.
4 There is intense competition for resources.

22. The level (flat) portion at the top of the graph indicates that the population

1 is growing
2 is shrinking
3 is neither growing nor shrinking
4 no longer exists in that location

23. Oxygen is needed for respiration, which

1 releases the chemical energy stored in food
2 uses carbon dioxide to produce sugars
3 breaks down the bodies of dead organisms
4 releases oxygen as a waste into the air

24. Why do plants live only in the top zone of the ocean?

1 There is too much salt in deeper water.
2 They automatically float to the top.
3 Plants cannot grow underwater.
4 Plants need sunlight to make food.

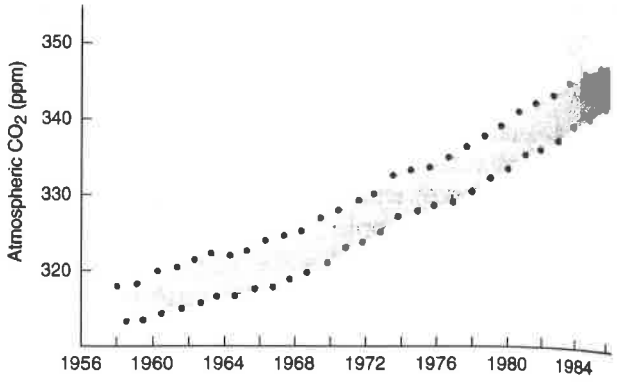
25. Recycling of materials such as glass, metal, and plastic helps to

1 keep the cost of groceries low
2 conserve our natural resources
3 prevent natural resources
4 build more wooden houses

26. Coal and wood are found in nature. They are both examples of

1 enzymes
2 resources
3 metals
4 proteins

Refer to the following graph to answer questions 27 and 28.



27. Changes in the amount of CO_2 in Earth's atmosphere have been correlated with steadily increasing average global temperatures over the past 50 years. Based on this statement and the data in the graph, you could reason that

1 as the amount of CO_2 in the air increases, the average temperature decreases
2 as the amount of CO_2 in the air increases, the average temperature increases
3 as the amount of CO_2 in the air decreases, the average temperature stabilizes
4 as the amount of CO_2 in the air decreases, the average temperature increases

28. According to the graph, from the late 1950s to the late 1980s, the amount of CO_2 in Earth's atmosphere has been

1 steadily decreasing
2 steadily increasing
3 staying about the same
4 going up and down

29. The effect of CO_2 and other greenhouse gases on the atmosphere can best be likened to that of a

1 blanket
2 balloon
3 pitcher of water
4 crowd of people

30. Chlorofluorocarbons are harmful to the environment because they

1 kill fish in lakes
2 form acid rain
3 cause ozone depletion
4 increase the greenhouse effect

31. Which list indicates a correct flow of energy?

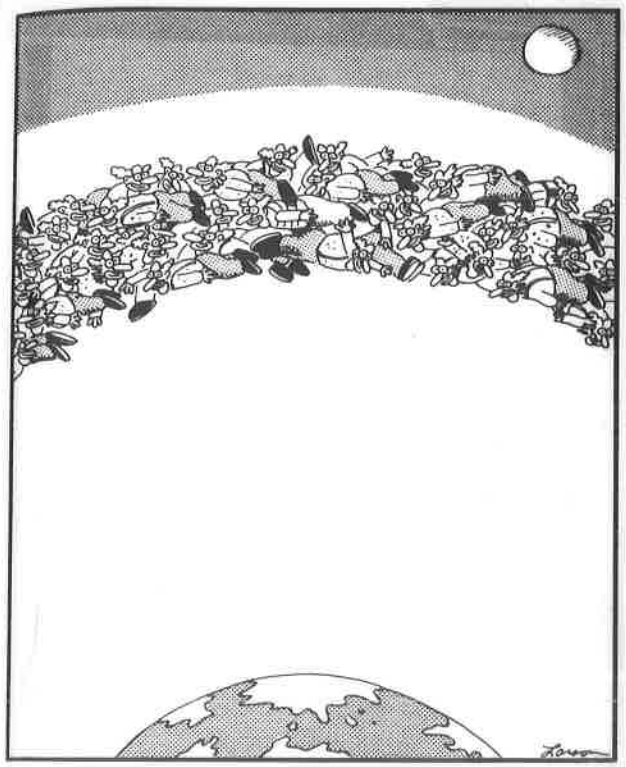
1 herbivore → sun → carnivore → decomposer
2 sun → plant → herbivore → carnivore
3 plant → sun → carnivore → herbivore
4 carnivore → herbivore → decomposer → plant

32. A spider stalks, kills, and then eats an insect. Based on this behavior, which ecological terms describe the spider's roles in a food chain?

1 producer, carnivore, consumer
2 carnivore, predator, consumer
3 predator, herbivore, consumer
4 scavenger, carnivore, consumer

33. Acid rain forms when

1 carbon dioxide traps heat near Earth
2 ozone is depleted from the atmosphere
3 gases from fossil fuels combine with water droplets in the air
4 chlorine is added to waste water



The bozone layer: shielding the rest of the solar system from the Earth's harmful effects.