

Name: \_\_\_\_\_  
HR. \_\_\_\_\_

NTI DAY #10  
(weather-closed school day)

PACKET

TEN  
(Science)

KLAUSMAN  
MAROON

**General Directions:**

Due to weather, Harrison County Schools are closed. In an effort to utilize this day on the school calendar, your child is assigned and should work on this "packet" of school work today. It will count as a grade for this subject. The work attached is specific to the subject listed above. Please contact your child's teacher of this subject at 234-7123 in the event you/your student have questions on this packet. Staff and teachers reported to HCMS today and are available should you have questions.

While this is DUE two (2) weeks after our return to school, we **strongly encourage** students to turn it in to their teacher as soon as **it's complete** (soon after the NTI day) to avoid it being lost, eaten by the family pet, burned to keep warm, etc ☺

SH

MANUAL  
ROOM

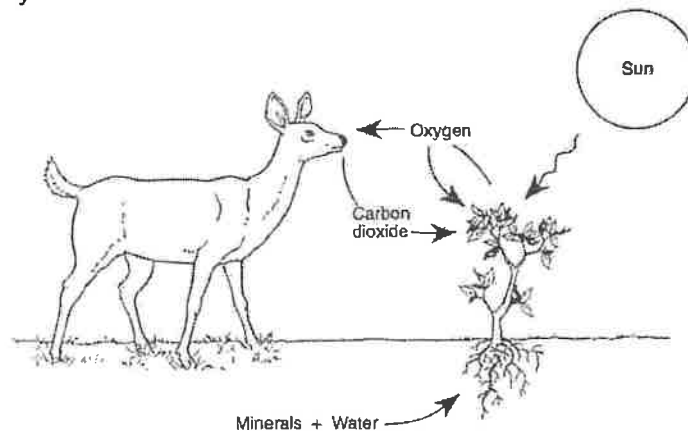
Name:  
Biology

Date:  
Period:

### The Carbon-Oxygen Cycle

- Which of the following explains why elements, such as carbon and oxygen, that are used in organic molecules are not permanently removed from the environment?
  - (1) They are replenished by sunlight.
  - (2) They are cycled through ecosystems.
  - (3) They are replaced by volcanic eruptions.
  - (4) They are produced constantly from nutrients.
- Which two processes are responsible for keeping the percentage of atmospheric oxygen at relatively constant levels?
  - (1) circulation and coordination
  - (2) respiration and coordination
  - (3) respiration and photosynthesis
  - (4) photosynthesis and circulation
- A five-year study was carried out on a population of algae in a lake. The study found that the algae population was steadily decreasing in size. Over the five-year period this decrease most likely led to
  - (1) a decrease in the amount of nitrogen released into the atmosphere
  - (2) an increase in the amount of oxygen present in the lake
  - (3) an increase in the amount of water vapor present in the atmosphere
  - (4) a decrease in the amount of oxygen released into the lake
- In an ecosystem, which component is not recycled?
  - (1) water
  - (2) energy
  - (3) oxygen
  - (4) carbon

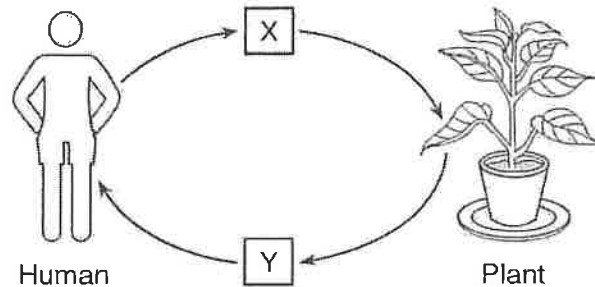
Base your answers to questions 5 and 6 on the diagram below which shows some relationships within a natural community.



- Which statement best explains the relationships shown?
  - (1) Water changes over time to a nonrenewable resource.
  - (2) Living things exchange materials with their environment.
  - (3) Minerals recycle the dead materials in the environment.
  - (4) Living things produce other living things.
- Which process produces oxygen that is released into the atmosphere?
  - (1) respiration
  - (2) locomotion
  - (3) excretion
  - (4) photosynthesis



7. The diagram below represents a cycling of materials.



Which row in the chart below shows the substances represented by X and Y?

Row	X	Y
(1)	oxygen	carbon dioxide
(2)	glucose	oxygen
(3)	carbon dioxide	oxygen
(4)	amino acids	carbon dioxide

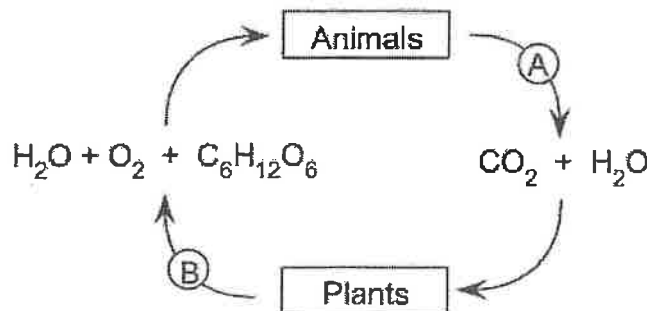
8. Carbon dioxide makes up less than 1 percent of Earth's atmosphere, and oxygen makes up about 20 percent. These percentages are maintained most directly by

(1) respiration and photosynthesis                      (3) synthesis and digestion  
 (2) the ozone shield    (4) energy recycling in ecosystems

9. Millions of acres of tropical rain forest are being destroyed each year. Which change would most likely occur over time if the burning and clearing of these forests were stopped?

(1) an increase in the amount of atmospheric pollution produced  
 (2) a decrease in the source of new medicines  
 (3) an increase in the amount of oxygen released into the atmosphere  
 (4) a decrease in the number of species

10. In the material cycle shown below, which processes are represented by letters A and B?



- (1) A—excretion, B—respiration  
 (2) A—transpiration, B—excretion  
 (3) A—photosynthesis, B—transpiration  
 (4) A—respiration, B—photosynthesis

11. Respiration and photosynthesis have the least effect on the cycling of

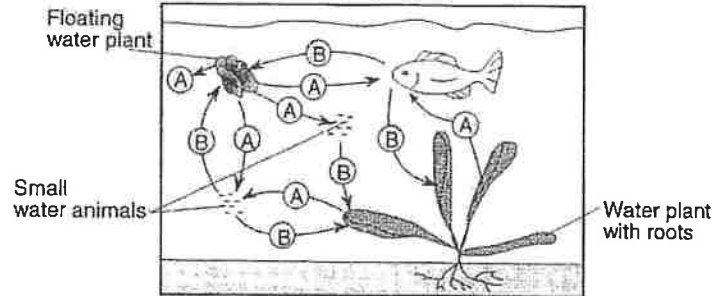
(1) carbon                      (2) nitrogen                      (3) oxygen                      (4) hydrogen

12. In an ecosystem, what happens to the atoms of certain chemical elements such as carbon, oxygen, and nitrogen?



- (1) They move into and out of living systems.
- (2) They are never found in living systems.
- (3) They move out of living systems and never return.
- (4) They move into living systems and remain there.

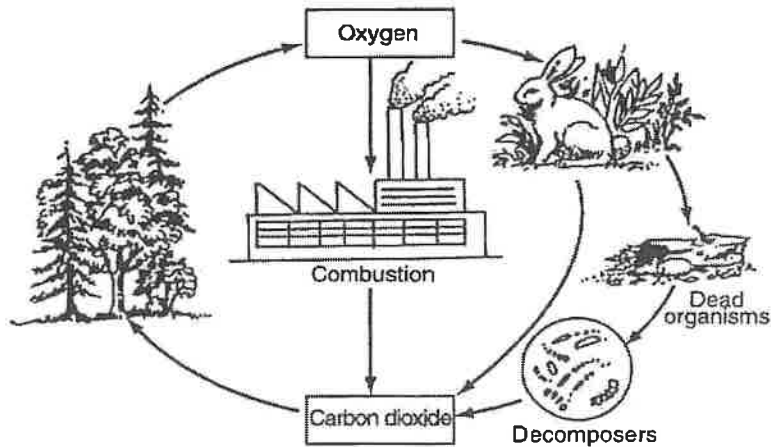
13 The diagram below shows an example of interdependence among aquatic organisms. During the day, the organisms either use or give off substance A or B, as shown by the arrows.



Which substances are represented by A and B?

- (1) A represents oxygen and B represents carbon dioxide.
- (2) A represents oxygen and B represents carbohydrates.
- (3) A represents nitrogen and B represents carbon dioxide.
- (4) A represents carbon dioxide and B represents oxygen.

Base your answers to the next 2 questions on the diagram below which shows some pathways in the cycling of materials in the environment.



14. Which two processes are involved in the cycling shown in the diagram?

- (1) succession and transpiration
- (2) photosynthesis and cellular respiration
- (3) artificial selection and deamination
- (4) enzymatic hydrolysis and regeneration

15. Which statement is best supported by the diagram above of the carbon-oxygen cycle?

- (1) Decomposers add oxygen to the atmosphere and remove carbon dioxide.
- (2) Combustion adds oxygen to the atmosphere and removes carbon dioxide.
- (3) Producers generate oxygen and utilize carbon dioxide.
- (4) Consumers generate oxygen and utilize carbon dioxide.

16. Which element is not recycled throughout an ecosystem by the processes of photosynthesis and respiration?





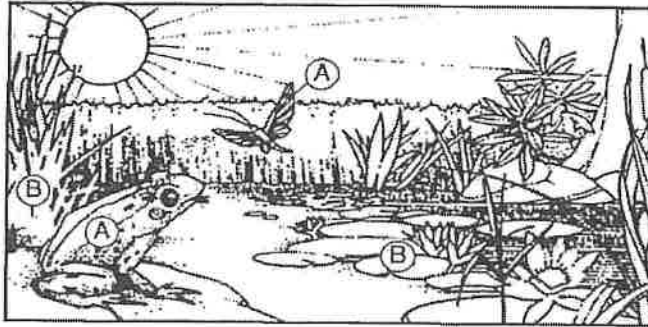
(1) carbon

(2) hydrogen

(3) phosphorus

(4) oxygen

17. An ecosystem is represented below.



What would make this ecosystem self-sustaining?

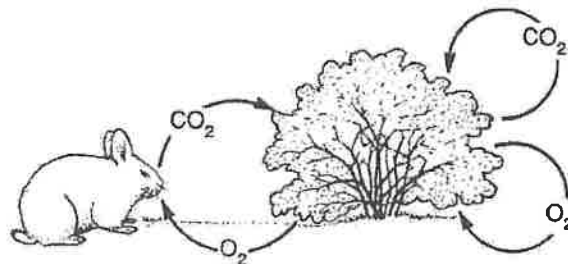
(1) the organisms labeled A outnumber the organisms labeled B

(2) the organisms labeled A are equal in number to the organisms labeled B

(3) the type of organisms represented by B are eliminated

(4) materials cycle between the organisms labeled A and the organisms labeled B

18. Which ecological principle is best illustrated by the diagram below?



(1) In an ecosystem, material is cycled among the organisms and their environment.

(2) As a result of competition between two species, one species will be excluded from the niche.

(3) Competition within a species results in natural selection.

(4) An ecosystem requires a constant source of energy

19. The exchange of respiratory gases and the synthesis of organic compounds by autotrophs are processes that are directly involved in the

(1) maintenance of soil fertility in an ecosystem

(2) transfer of materials in the carbon-hydrogen-oxygen cycle

(3) transfer of nitrogen through a food chain

(4) distribution of minerals in an ecosystem

20. In an ecosystem, which group of organisms puts a large amount of oxygen into the air?

(1) animals

(2) bacteria

(3) fungi

(4) plants

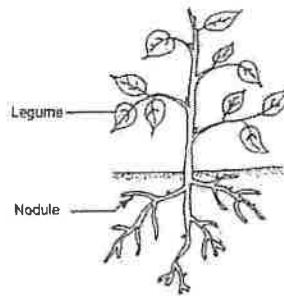
21. Which diagram best represents the cycling of respiratory and photosynthetic gases in green algae?







5. The plant represented in the diagram below is associated with the nitrogen cycle.



This plant is directly involved in the

- (1) release of ammonia to the atmosphere
- (2) decomposition of dead organisms
- (3) conversion of atmospheric nitrogen to nitrates
- (4) synthesis of atmospheric nitrogen from ammonia

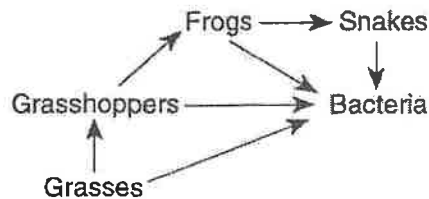
6. Ammonia is released from dead plants by

- (1) denitrifying bacteria
- (2) nitrogen-fixing bacteria
- (3) bacteria of decay
- (4) nitrifying bacteria

7. Which type of bacteria performs the first step in recycling nitrogen compounds from the bodies of plants and animals?

- (1) nitrogen-fixing bacteria
- (2) bacteria of decay
- (3) nitrifying bacteria
- (4) denitrifying bacteria

8. A food web is shown below.



Which organisms are necessary for the recycling of nitrogen?

- (1) frogs
- (2) grasshoppers
- (3) snakes
- (4) bacteria

9. Which statement correctly describes how nitrogen in the soil returns to the atmosphere?

- (1) Soil bacteria convert nitrates into nitrogen gas.
- (2) Decomposers directly convert ammonium into nitrogen gas.
- (3) Plants assimilate nitrates and convert them into nitrogen gas.
- (4) Nitrogen-fixing bacteria in plant roots convert nitrates into nitrogen gas.

10. Atmospheric nitrogen can only be used by most living things after it has been

- (1) converted to nitrates with the help of nitrogen-fixing bacteria
- (2) taken in by plants through the lenticels
- (3) converted to ammonia by bacteria of decay
- (4) combined with carbon dioxide to form protein



11. Where would nitrogen most easily be found in the nitrogen cycle?
- (1) in animal waste
  - (2) in drinking water supplies
  - (3) in underground mineral deposits
  - (4) in carbon dioxide released by factories into the atmosphere
12. Legumes, such as clover and alfalfa, have nodules on their roots that contain nitrogen-fixing bacteria. These bacteria convert nitrogen gas from the atmosphere into nitrates. Which of the following best accounts for the presence of nitrogen-fixing bacteria in legume root nodules?
- (1) Nitrates are a food source for earthworms.
  - (2) Plants can use nitrates, but not nitrogen gas.
  - (3) Nitrates are one of the reactants in photosynthesis.
  - (4) Nitrogen gas is toxic to most plants, but nitrates are nontoxic.
13. Which of the following correctly explains how atmospheric nitrogen is converted to nitrogen compounds used by living organisms?
- (1) Sunlight converts atmospheric nitrogen to a form usable by protists.
  - (2) Plant leaves convert atmospheric nitrogen to a form usable by animals.
  - (3) Bacteria in soil convert atmospheric nitrogen to a form usable by plants.
  - (4) Invertebrate animals in soil convert atmospheric nitrogen to a form usable by fungi.
14. If a certain type of poison were to destroy nitrogen-fixing bacteria, the most immediate result would be
- (1) a decrease in the percentage of atmospheric nitrogen
  - (2) a decrease in the nitrate concentration in legumes
  - (3) an increase in the percentage of atmospheric CO<sub>2</sub>
  - (4) an increased number of healthier legumes
15. The table below shows the approximate amounts of nitrogen fixed per year by various processes worldwide.

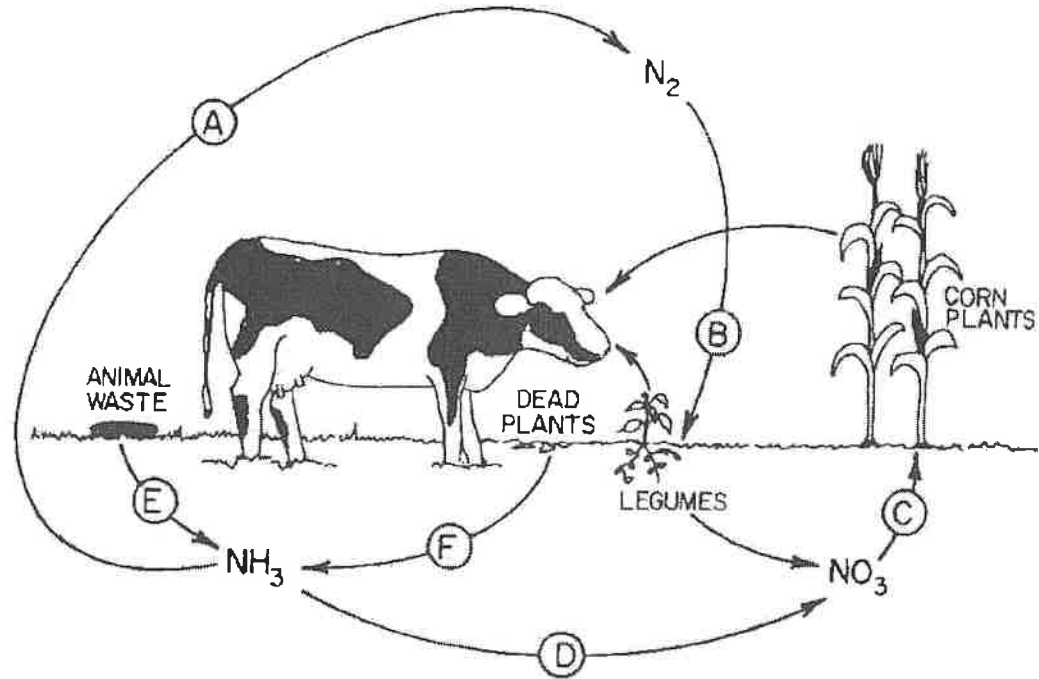
Process	Amount of Nitrogen Fixed per Year ( $\times 10^6$ metric tons)
<b>Nonbiological</b>	
industrial	50
combustion	20
lightning	10
<b>Biological</b>	
microorganisms on agricultural land	90
microorganisms on forest and nonagricultural land	50
microorganisms in water	35

- Base on the data, which of the following conclusions can be made?
- (1) Aquatic ecosystems are more nitrogen-rich than terrestrial ecosystems.
  - (2) Forests and nonagricultural land needs more nitrogen than agricultural land needs.
  - (3) The global nitrogen cycle would be relatively unaffected if no fixation occurred by industrial processes.
  - (4) The amount of nitrogen fixed by biological processes is more than two times the amount fixed by nonbiological processes.





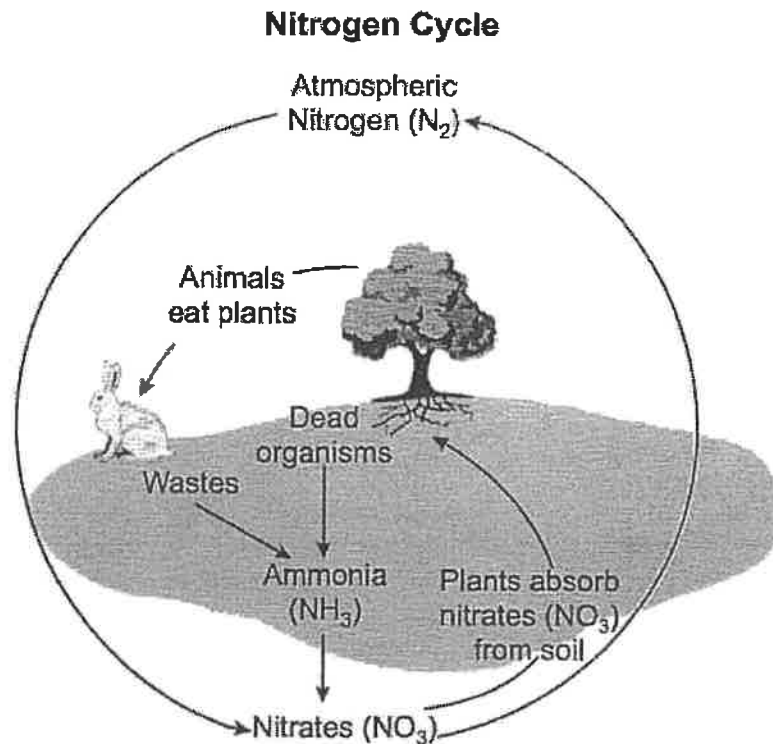
Base your answers to questions 16 through 19 on the diagram below of a nitrogen cycle and on your knowledge of biology.



16. What is the role of plants in this cycle?
- (1) absorbing nitrates for protein synthesis
  - (2) converting nitrogen gas to ammonia
  - (3) synthesizing carbohydrates from nitrogen gas
  - (4) decomposing amino acids to nitrates
17. The organisms that carry on nearly all of the processes represented by arrows A through F are most likely
- (1) legumes
  - (2) bacteria
  - (3) herbivores
  - (4) scavengers
18. The arrow labeled D represents the process of
- (1) nitrogen fixation
  - (2) decomposition
  - (3) nitrification
  - (4) denitrification
19. The action of decomposers is represented by arrows
- (1) A and B
  - (2) E and F
  - (3) C and D
  - (4) D and F



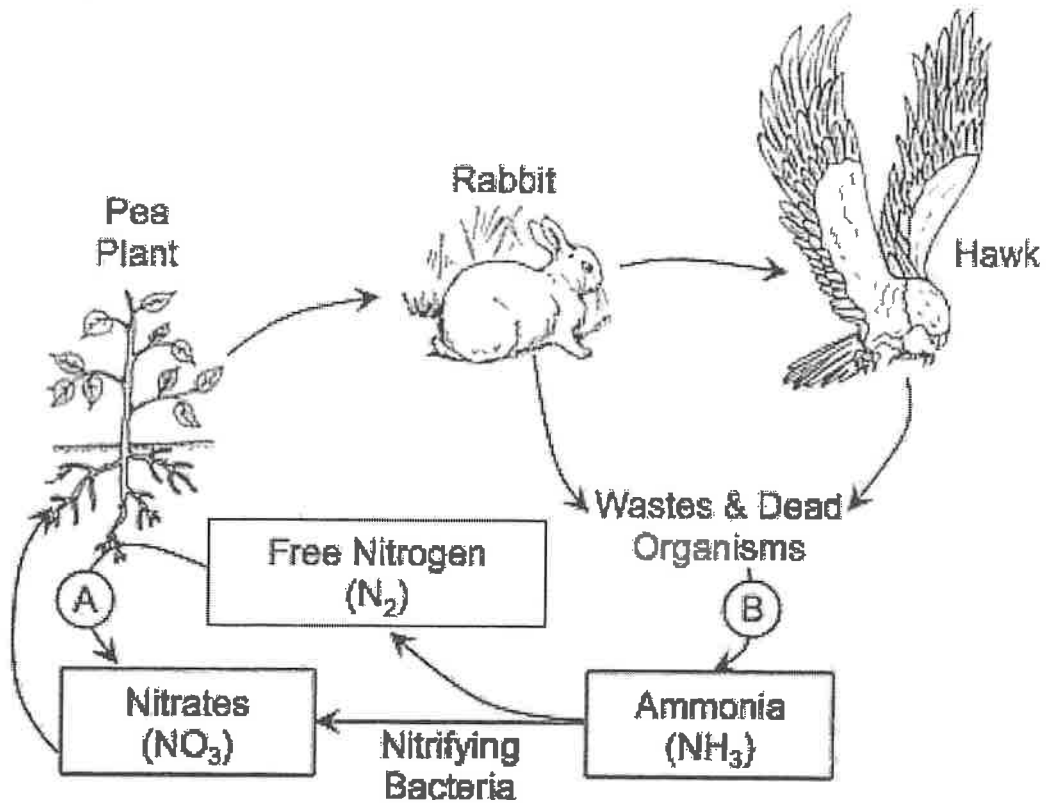
Base your answers to question 20 through 24 on the diagram below which shows the nitrogen cycle.



20. Animals need nitrate ( $NO_3$ ) to make proteins. Nitrogen ( $N_2$ ) is found in the air but is not in a form that animals can use. Through the nitrogen cycle, nitrogen from the atmosphere becomes nitrate. Which of these can be concluded about the importance of bacteria in the nitrogen cycle?
- (1) Bacteria are important because they make nitrates that animals need.
  - (2) Bacteria are important because they can change nitrogen into nitrates that animals need.
  - (3) Bacteria are important because they allow plant roots to absorb nitrates from the air.
  - (4) Bacteria are important because they decompose plant matter that competes with living plant for nitrates.
21. Nitrogen in the cells of plants and animals is first released to other organisms with the help of
- (1) denitrifying bacteria
  - (2) nitrogen-fixing bacteria
  - (3) nitrifying bacteria
  - (4) decomposers
22. Which substance would most likely be included in the area labeled "Wastes"?
- (1) urea
  - (2) sulfur
  - (3) carbon dioxide
  - (4) mineral salt
23. In the nitrogen cycle, decomposers break down nitrogen compounds and release
- (1) oxygen gas
  - (2) ammonia
  - (3) urea
  - (4) nitrogen gas
24. Which combination correctly pairs a product from a reaction in the nitrogen cycle with a molecule synthesized by plants using that product?
- (1) nitrates—proteins
  - (2) ammonia—lipids
  - (3) nitrogenous wastes—nitrites
  - (4) atmospheric nitrogen—nitrates



Base your answer to questions 25 through 27 on the diagram below of the nitrogen cycle and on your knowledge of biology.



25. Which organisms are responsible for the conversion of free nitrogen to nitrates at position A?
- (1) bacteria of decay
  - (2) decomposers
  - (3) nitrogen-fixing bacteria
  - (4) denitrifying bacteria

26. What is the role of nitrates (NO<sub>3</sub>) in the cycle?
- (1) It is converted to atmospheric nitrogen.
  - (2) It is used by animals for carbohydrate synthesis.
  - (3) It is used by plants for protein synthesis.
  - (4) It is used by bacteria to synthesize ammonia.

27. The process represented by letter B is
- (1) nitrogen-fixation
  - (2) decomposition
  - (3) respiration
  - (4) photosynthesis

