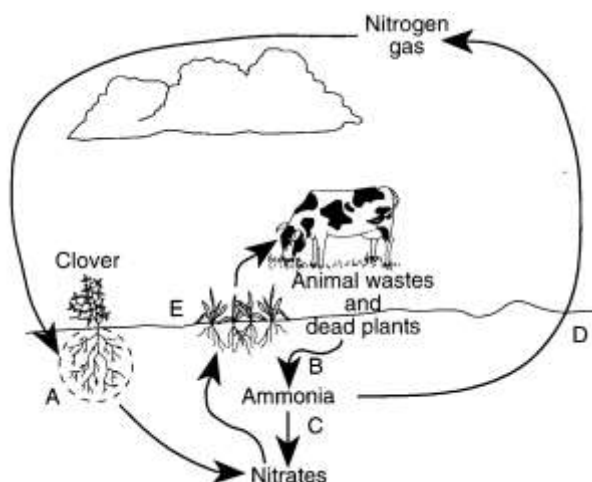


## WATER, CARBON, AND NITROGEN CYCLES CHECKPOINT REVIEW

- Which of the following is not a form of condensation?
  - clouds
  - rain
  - dew
  - fog
  - frost

Base your answers to **questions 2 and 3** on the diagram of the nitrogen cycle below. In the diagram, letters A through E represent organisms carrying on a process at that particular point in the cycle.

- Nitrifying bacteria are represented by letter
  - A
  - B
  - C
  - D
  - E



- Letter B represents
  - inorganic nitrogen fixation
  - assimilation
  - decomposition by bacteria
  - nitrification
  - denitrification

- Which of the following gases are the most abundant in the lower part of the atmosphere?
  - nitrogen and oxygen
  - carbon dioxide and oxygen
  - nitrogen and carbon dioxide
  - carbon dioxide and nitrous oxide
  - water vapor and nitrogen

- In order to classify groundwater as a potentially renewable resource, which of the following must be true?
  - The rate of precipitation must be greater than the rate of transpiration.
  - The rate of infiltration must be greater than or equal to the rate of percolation.
  - The rate of infiltration must be greater than or equal to the rate of use.
  - The rate of seepage must be greater than the rate of evaporation.
  - The rate of evaporation must be greater than or equal to the rate of infiltration.

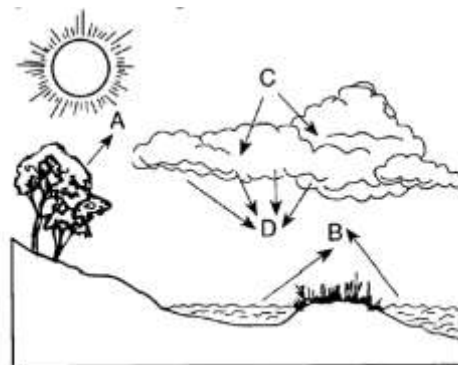
6. All of the following can lead to an excess of in carbon dioxide in the atmosphere and therefore climate change except
- (A) deforestation
  - (B) burning fossil fuels
  - (C) slash and burn agricultural practices
  - (D) wildfires
  - (E) agricultural runoff
7. Which of the following processes in the water cycle serve to return water back into the ground?
- I. evaporation
  - II. precipitation
  - III. infiltration
  - IV. percolation
- (A) I, II, and III only
  - (B) I, II, and IV, only
  - (C) I, III, and IV only
  - (D) II, III and IV, only
  - (E) I, II, III, and IV
8. Rhizobium bacteria in the root systems of legumes convert nitrogen into ammonia by the process of
- (A) ammonification
  - (B) assimilation
  - (C) denitrification
  - (D) nitrification
  - (E) nitrogen fixation
9. After which process can only decomposition by bacteria return nitrogen to the soil?
- (A) photosynthesis
  - (B) assimilation
  - (C) carbonification
  - (D) denitrification
  - (E) evapotranspiration
10. Long Island extracts most of its water from
- (A) upstate reservoirs
  - (B) the Lloyd aquifer
  - (C) the Magothy aquifer
  - (D) the Upper Glacier aquifer
  - (E) the Connecticut River
11. What is the primary abiotic source of nitrogen in the nitrogen cycle?
- (A) the atmosphere
  - (B) plants
  - (C) salt-water environments
  - (D) rocks and minerals
  - (E) bacteria

12. Which of the following chain of events would occur as a result of land clearing/deforestation?  
(vocabulary check: efflux means flowing away)
- (A) nutrient efflux → water pollution → water runoff → soil erosion
  - (B) nutrient efflux → soil erosion → water runoff → water pollution
  - (C) water pollution → nutrient efflux → soil erosion → water runoff
  - (D) water runoff → water pollution → nutrient efflux → soil erosion
  - (E) water runoff → soil erosion → nutrient efflux → water pollution
13. Terrestrial plants \_\_\_\_\_ CO<sub>2</sub> in the atmosphere, aquatic plants \_\_\_\_\_ CO<sub>2</sub> in the water, and animals \_\_\_\_\_ CO<sub>2</sub> in the atmosphere.
- (A) remove, remove, remove
  - (B) remove, remove, replenish
  - (C) remove, replenish, replenish
  - (D) replenish, remove, replenish
  - (E) replenish, replenish, replenish
14. Most evaporation from oceans and lakes is caused by
- (A) chemical energy from deep sea vents
  - (B) nuclear energy from deep sea vents
  - (C) radiant energy from condensed water on the surface of the Earth
  - (D) the gravitational pull of the Earth
  - (E) solar energy released by the Sun
15. What is the percentage of nitrogen gas in the lower atmosphere?
- (A) 71%
  - (B) 2%
  - (C) less than 1%
  - (D) 78%
  - (E) 97%
16. Increased fossil fuel use has affected the nitrogen cycle by
- (A) decreasing the pH of precipitation through HNO<sub>3</sub> formation
  - (B) decreasing NO<sub>2</sub> formation
  - (C) increasing nitrous oxide formation
  - (D) A and B, only
  - (E) A and C, only
17. Which two processes are responsible for keeping the percentage of atmospheric carbon dioxide at relatively constant levels?
- (A) respiration and photosynthesis
  - (B) decomposition and natural diffusion
  - (C) assimilation and ammonification
  - (D) carbonification and sedimentation
  - (E) evaporation and precipitation

18. Processes involved in the water cycle are represented by letters in the diagram below.

In which group are these processes correctly identified?

- (A) A-precipitation; B-transpiration; C-condensation; D-evaporation
- (B) A-transpiration; B-evaporation; C-precipitation; D-condensation
- (C) A-condensation; B-precipitation; C-transpiration; D-evaporation
- (D) A-transpiration; B-evaporation; C-condensation; D-precipitation
- (E) A-transpiration; B-condensation; C-evaporation; D-precipitation



19. Nodules on the roots of legumes contain

- (A) denitrifying bacteria, which produce amino acids
- (B) nitrogen-fixing bacteria, which help produce nitrates
- (C) bacteria that release ammonia into the soil
- (D) bacteria that produce protein for absorption by plants
- (E) nitrifying bacteria that produce toxic nitrites

20. Coal is formed by a process known as

- (A) sedimentation
- (B) carbonification
- (C) combustion
- (D) decomposition
- (E) B and C, only

21. Which organisms are capable of converting ammonia to nitrates?

- (A) legumes
- (B) animals
- (C) denitrifying bacteria
- (D) nitrifying bacteria
- (E) flowering plants

22. Which combination correctly pairs a product from a reaction in the nitrogen cycle with an organic molecule synthesized by plants using that product?

- (A) nitrates—proteins
- (B) ammonia—carbohydrates
- (C) nitrogenous wastes—nitrites
- (D) atmospheric nitrogen—nitrates
- (E) atmospheric nitrogen—ammonia

23. Saltwater intrusion can occur when

- (A) groundwater storage exists close to an ocean
- (B) human extract freshwater from the ground for use
- (C) precipitation and infiltration increases
- (D) A and B, only
- (E) A, B, and C

24. The ocean is considered the #2 carbon sink on Earth. This is because carbon in the oceans is sequestered
- (A) in aquatic plants
  - (B) as carbonate ions
  - (C) as dissolved carbon dioxide
  - (D) as it is incorporated in the shells of organisms
  - (E) in all of the above
25. Which of the following is a greenhouse gas?
- (A)  $N_2$
  - (B)  $O_2$
  - (C)  $N_2O$
  - (D)  $NO_3$
  - (E)  $HCO_3^-$
26. A bioswale is a carefully engineered drainage system that filters water and allows it to infiltrate through
- (A) chemically treated sand and clay
  - (B) amended soil with a sand and gravel underlay
  - (C) uniformly planted legumes
  - (D) a strategically placed recharge basin
  - (E) a man-made watershed
27. A thunderstorm follows a long stretch of dry weather on Long Island. Which of the following scenarios will occur?
- (A) Infiltrating water will cause the water table to drop creating a large zone of aeration
  - (B) Infiltrating water will cause the water table to drop creating a large zone of saturation
  - (C) Infiltrating water will cause the water table to rise creating a large zone of aeration
  - (D) Infiltrating water will cause the water table to rise creating a large zone of saturation
  - (E) There will be no change in the water table or groundwater zones.
28. Cultural eutrophication is an environmental condition that occurs when
- (A) a pond ecosystem becomes naturally nutrient-enriched over time
  - (B) fossil fuel burning causes increased diffusion of carbon dioxide into nearby bodies of water
  - (C) increased human population leads to an overuse of resources such as groundwater
  - (D) watersheds overlap causing cross-contamination of polluted water.
  - (E) runoff from nearby farms brings excess nitrogen into local bodies of water
29. What is  $CaCO_3$ ?
- (A) granite
  - (B) coal
  - (C) limestone
  - (D) gypsum
  - (E) acid rain
30. Which process plays a significant role in the water, carbon, and nitrogen cycles?
- (A) photosynthesis
  - (B) evaporation
  - (C) respiration
  - (D) runoff
  - (E) ammonification