

BIOGEOCHEMICAL CYCLES:
A DECENTLY COMPREHENSIVE REVIEW
PART 2

26. Which of the following is NOT a carbon sink?
- (A) limestone sediment
 - (B) trees
 - (C) the atmosphere
 - (D) coal and other fossil fuels stored in the Earth's crust
 - (E) the ocean
27. Nitrogen is essential for living organisms to make
- (A) lipids
 - (B) proteins
 - (C) carbohydrates
 - (D) sulfates
 - (E) nitrites
28. A recharge basin is designed to
- (A) collect urban runoff and provide a location that allows it to infiltrate
 - (B) use specialized soils to filter water as it gets absorbed in the ground
 - (C) provide a direct water source for nearby towns
 - (D) all of the above
 - (E) none of the above
29. How does land clearing affect nutrient cycles?
- (A) land clearing destroys native habitats
 - (B) land clearing leads to more soil erosion and nutrient flow into nearby bodies of water
 - (C) land clearing decreases the amount of nitrogen and carbon dioxide in the atmosphere
 - (D) land clearing increases the amount of phosphorus present in the soil
 - (E) land clearing reduces surface runoff
30. What are ways to reduce one's carbon footprint?
- (A) replace old appliances with Energy Star appliances
 - (B) use the HOV lane by carpooling
 - (C) use programmable thermostats
 - (D) plant trees or contribute money to do so by purchasing carbon offsets
 - (E) all of the above
31. Which two cycles are cumulatively the slowest in nature because they are dominantly sedimentary cycles and driven by geological processes?
- (A) carbon and water
 - (B) water and nitrogen
 - (C) nitrogen and phosphorus
 - (D) phosphorus and sulfur
 - (E) nitrogen and carbon

32. Which human activities have an effect on the sulfur cycle?
- (A) mining
 - (B) burning fossils fuels
 - (C) smelting
 - (D) A and C, only
 - (E) all of the above
33. What is the composition of sulfuric acid rain?
- (A) H_2S
 - (B) SO_2
 - (C) S_2O_4
 - (D) H_2SO_4
 - (E) SAR
34. The amount of dissolved oxygen that must be present in water in order for bacteria to decompose the organic matter in the water is known as
- (A) DOB
 - (B) BOD
 - (C) BO
 - (D) DO
 - (E) DOH
35. Humans contribute to the increased sulfur in the atmosphere by
- (A) adding hydrogen sulfide into commercial fertilizers
 - (B) burning coal and oil to produce electric power
 - (C) deforestation
 - (D) producing dimethyl sulfide as a commercial fertilizer
 - (E) being decayed by aerobic decomposers as dead matter and releasing hydrogen sulfide gas
36. Of the following, which are commonly found in the gaseous phase?
- I. Carbon
 - II. Phosphorous
 - III. Sulfur
 - IV. Nitrogen
- (A) I, II, and III only
 - (B) I, II, and IV, only
 - (C) I, III, and IV only
 - (D) III and IV, only
 - (E) I, II, III, and IV
37. Which gas pollutants from anthropogenic sources would be responsible for the formation of acid rain (acid deposition)?
- (A) NO_2 and N_2
 - (B) SO_2 and NO_2
 - (C) N_2 and CaCO_3
 - (D) NO_3 and CO_3^{2-}
 - (E) PO_4^{3-} and CaCO_3

38. Human influences have resulted in all of the following inputs of phosphorus except
- (A) acid rain
 - (B) runoff from private golf courses
 - (C) dumping of commercial fertilizer
 - (D) discharge from a city sewer
 - (E) runoff from commercial detergents
39. During the process of decomposition, anaerobic bacteria can produce
- (A) H_2S and N_2O
 - (B) N_2 and HNO_3
 - (C) S_2O_4 and O_2
 - (D) CaCO_3 and CO_3^{2-}
 - (E) SO_2 and PO_4^{3-}

Use the following list of processes to answer 40-42.

- (A) nitrification
 - (B) denitrification
 - (C) organic nitrogen fixation
 - (D) ammonification
 - (E) assimilation
40. performed in the root systems of soybeans
41. directly leads to the formation of NO_3^-
42. decomposition process that forms NH_3 from dead organic matter

Use the following list of compounds to answer 43-45.

- (A) gypsum
 - (B) pyrite
 - (C) sulfuric acid
 - (D) nitric acid
 - (E) limestone
43. mined for its iron and sulfur content
44. formed by sedimentation of carbonate material
45. can contribute to eutrophication

True or False: If the statement is false, write a new statement in the same context to make it true. (Do not just negate the statement!)

- ___ 46. Eutrophication is always caused by human activities.
- ___ 47. The largest storage of carbon is in the oceans.
- ___ 48. Burning fossil fuels only affects the carbon cycle.
- ___ 49. Runoff and soil erosion are only a significant part of the water cycle.
- ___ 50. Denitrification is carried out by aerobic bacteria in swampy, marshy environments.
- ___ 51. Plants assimilate nitrites to make DNA and amino acids.
- ___ 52. NH_3 is the chemical composition of ammonia.
- ___ 53. Allotropic means nutrient-poor.
- ___ 54. Natural diffusion adds dissolved CO_2 gas to the oceans.
- ___ 55. An artesian well is designed to extract water from aquifers for household and commercial use.
- ___ 56. Nitrogen is the only substance that contributes to cultural eutrophication.
- ___ 57. The chemical formula for the carbonate ions dissolved in seawater is CaCO_3 .
- ___ 58. Lightning can cause nitrogen fixation.
- ___ 59. Eutrophication occurs when the BOD increases and therefore dissolved oxygen in water decreases.
- ___ 60. As runoff of water increases, the amount of water that infiltrates the ground decreases.
- ___ 61. Bioswales are the same as a conventional sewer system.
- ___ 62. Natural landscape formations create divides that determine which watershed surface water will flow into.
- ___ 63. The water table is always located at the same depth below the ground.