

# SCIENCE 10 - Nutrient Cycles in Ecosystems

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

1. What does the term nutrient mean?

2. List four nutrients that move through the biosphere as a part of the nutrient cycles?

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\_\_\_\_\_

3. What is another term for stored carbon?

4.

(a) Is more carbon stored in the atmosphere or in oil and gas deposits? \_\_\_\_\_

(b) Is the second-largest store of carbon a short-term or a long-term store? \_\_\_\_\_

(c) Is more carbon stored in plants or in the soil that they grow in? \_\_\_\_\_

(d) Which carbon store is larger than all the other carbon stores combined? \_\_\_\_\_

4. What is the function of carbon? What is it the main component of?

5. How many gigatonnes of carbon are stored in each of the following locations?

Carbon Store	Amount of Carbon (gT)
Marine sediments and sedimentary rock	68 000 000 to 100 000 000
Oceans (intermediate and deep water)	38 000 to 40 000
Coal deposits	3000
Soil and organic matter	1500 to 1600
Atmosphere	750
Terrestrial vegetation	540 to 610
Oil and gas deposits	300

(a) the atmosphere \_\_\_\_\_

(b) dissolved as organic carbon in the upper levels of the ocean \_\_\_\_\_

(c) organic matter in the soil \_\_\_\_\_

6. How is the process of denitrification different from nitrogen fixation and nitrification?

7. List three human activities that increase the amount of available nitrogen in the biosphere

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8. What does nitrogen do for plants? How is that helpful for them?

9. Excess nitrogen in the ecosystem increases the amount of algal blooms. List two negative effects of algal blooms.

10. Unlike carbon and nitrogen, phosphorus is not stored in the atmosphere. Where is it stored?

11. How do phosphates that are present in rocks eventually make their way into animals?

12. What human activities effect the phosphorus cycle? List two.

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13. How do changes in nutrient cycles affect biodiversity?

14.

The effective cycling of nutrients in an ecosystem primarily depends on which of the following conditions?

- A. rapid return of nutrients to deep stores
- B. rapid rates of decomposition of organic matter
- C. abundant resources of nutrients in the atmosphere
- D. balanced rates of production, consumption, and decomposition

16.

Where is the largest store of carbon found on Earth?

- A. in coal deposits
- B. in terrestrial vegetation
- C. in soil and organic matter
- D. in marine sediments and sedimentary rock

Which term describes the process of converting nitrogen gas ( $N_2$ ) into nitrate ( $NO_3^-$ ) or ammonium ( $NH_4^+$ )?

- A. uptake
- B. nitrification
- C. denitrification
- D. nitrogen fixation

19.

15.

Which of the following chemical nutrients is **not** cycled between living organisms and the atmosphere?

- A. phosphorus
- B. nitrogen
- C. carbon
- D. oxygen

17.

Which of the following processes does **not** increase the amount of carbon dioxide ( $CO_2$ ) in the atmosphere?

- A. forest fires
- B. photosynthesis
- C. cellular respiration
- D. decomposing trees

18.

Which of the following relationships between human activities and nutrient cycles is **not** true?

- A. The clearing and burning of forests increases the amount of phosphate ( $PO_4^{3-}$ ) available to organisms.
- B. The burning of fossil fuels for industry increases the amount of nitrogen oxide (NO) in the atmosphere.
- C. The use of fertilizers for agriculture increases the amounts of nitrate ( $NO_3^-$ ) and phosphate ( $PO_4^{3-}$ ) in water systems.
- D. The use of motorized vehicles increases the amount of carbon dioxide ( $CO_2$ ) in the atmosphere.

20.

Which of the following processes makes nitrogen available to plants and animals?

I	Nitrogen-fixing bacteria in the soil
II	Nitrogen-fixing cyanobacteria in the water
III	Decomposer bacteria and fungi in the soil
IV	Nitrifying bacteria in the soil

- A. I and IV only
- B. I, II, and III only
- C. I, III, and IV only
- D. I, II, III, and IV

21.

How do carnivorous animals obtain the phosphorus that they need for growth and development?

- A. Plants produce phosphorus through cellular respiration and make it available to animals.
- B. Bacteria break down the phosphorus in the soil and make it available to animals.
- C. The animals eat other consumers that have obtained phosphorus from plants.
- D. The animals eat plants, which have absorbed phosphorus through the soil.

22. Match each term on the left with the best descriptor on the right.

<p>1. _____ Cellular Respiration</p> <p>2. _____ Denitrification</p> <p>3. _____ Nitrification</p> <p>4. _____ Nutrients</p> <p>5. _____ Photosynthesis</p> <p>6. _____ Sedimentation</p> <p>7. _____ Weathering</p>	<p>a. the process in which nitrogen is released into the atmosphere</p> <p>b. substances, such as nitrogen and phosphorus that are required by plants and animals for energy, growth, development and repair.</p> <p>c. the process in which rock is broken into smaller fragments</p> <p>d.</p> $C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O + \text{Energy}$ <p>e.</p> $6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6O_2$ <p>f. the process in which ammonium is converted into nitrate</p> <p>g. the process in which soil particles and decaying organic matter accumulate in layer on the ground or at the bottom of large bodies of water.</p>
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YOU ARE DONE 😊