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| **Carbon Nitrogen Practice Questions SOLUTIONS** |

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| **Carbon Cycle**  http://www.qacps.k12.md.us/cms/teachers/sci/ecounit/CCycle.jpg |
| 1. Carbon is essential to life because             A. It’s the most common element.              B. There can’t be life without it.              C. It is produced in both photosynthesis and respiration.              D. It is the molecule around which the organic molecules of life are built.    **Explanation**: Organic molecules are large molecules built around a base of carbon atoms. An example is glucose (C6H12O6).    2. Plants get the carbon to make their molecules from  A. The carbon dioxide in the air              B. The ground              C. The combination of oxygen and water              D. The waste of animals    **Explanation**: Photosynthesis is how plants get the ingredients to make glucose. The carbon to make glucose comes from the carbon dioxide (CO2) that plants take in through their leaves.    3. Which of the following decreases carbon dioxide levels in the atmosphere?  A. Cellular Respiration              B. Decomposition by bacteria              C. Burning fossil fuels              D. Photosynthesis    **Explanation**: Photosynthesis takes in carbon dioxide (CO2) to make glucose. This reduces the carbon dioxide in the atmosphere. This is why trees, grasses, and algae all are solutions to global warming caused by excessive carbon dioxide (CO2). All three of the other processes involve taking in oxygen (O2) and releasing carbon dioxide (CO2), thus increasing the carbon dioxide in the atmosphere.    4. The oxygen for your body comes from  A. Cellular Respiration              B. The ground              C. Eating plants and animals              D. Photosynthesis in plants    **Explanation**: Photosynthesis produces oxygen as waste. Plants and algae breathe out this oxygen into the atmosphere. We then breathe in the oxygen (O2) for cellular respiration – to release the energy from glucose. Oxygen is needed for cellular respiration, but it does not come from this process.    **5.** The large increase in atmospheric carbon dioxide in the last 50 years most likely comes from  A. An increase in cellular respiration              B. Increased decomposition by bacteria              C. An increase in the burning of fossil fuels              D. An increase in photosynthesis    **Explanation**: Cellular Respiration (A) and Decomposition (B) both add to carbon dioxide, but there is no evidence that these have increased over the last 50 years. Photosynthesis (D) decrease carbon dioxide. However, an increase in the burning of fossil fuels (C) has increased. For example, there are many more cars burning gasoline than in the past. |

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| http://www.qacps.k12.md.us/cms/teachers/sci/ecounit/NCycle.jpg |
| 6. Nitrogen is essential to life because             A. It is needed for building the proteins needed for cells.              B. It is the molecule around which all the molecules of life are built.              C. It is needed for making carbohydrates and lipids.              D. It is the most common element.    **Explanation**: Cells are built out of protein molecules; these are organic molecules built around carbon and nitrogen. To grow, you need to add protein, and you need nitrogen for this.    7. Plants get nitrogen from             A. Breathing it in through their leaves from the atmosphere              B. Absorbing it through roots from the ground              C. Basic photosynthesis              D. Cellular Respiration    **Explanation**: Plants get nitrogen in the form of nitrates (NO3) from the ground. This inorganic form of nitrogen dissolves in water and is absorbed by the plant when it takes in water through the roots. Plants cannot get nitrogen from the air.    8. Nitrogen-fixing bacteria are important because              A. They turn nitrogen from the air into nitrogen compounds in the soil              B. They are essential for plants being able to carry out photosynthesis.              C. They break up dead plants and animals in the soil.              D. They release excess nitrogen from the soil into the atmosphere.    **Explanation**: Nitrogen-fixing bacteria are attached to the roots of legumes (beans, peas). They take atmospheric nitrogen (N2) and convert it to nitrates (NO3) in the soil. This is why soybeans do not need fertilizer; they make their own.      9. Which statement about decomposition is most correct?              A. Bacteria and fungi carry out the photosynthesis needed for breaking down proteins.              B. Bacteria and fungi produce the oxygen needed for photosynthesis.              C. Bacteria put oxygen back into the atmosphere.              D. Bacteria and fungi use oxygen to break down organic nitrogen to nitrates that plants can use.      **Explanation**: In decomposition, bacteria use oxygen to convert ammonium (NH4) to nitrates (NO3). Plants can then use the nitrates for growth.    10. Excess nitrates in water cause problems for the Chesapeake Bay because              A. They cause excessive cellular respiration in plants and animals, resulting in a large amount of                    carbon dioxide production.              B. They cause excessive bacteria growth resulting in too much oxygen which hurts photosynthesis                     in plants.              C. They cause excessive algae growth, blocking sunlight and reducing oxygen when the algae dies.              D. Nitrates are poisonous to fish, crabs, and oysters.    **Explanation**: Excessive nitrates in the water cause algae to grow. This is called eutrophication. The algae block sunlight from reaching the SAVs (grasses) on the bottom. When the algae die, the bacteria decomposing them use up considerable oxygen in the decomposition process.  Also:   1. Nitrates are not part of cellular respiration. 2. Nitrates may contribute to bacteria growth, but the bacteria would use up oxygen, not produce it.   D.  Nitrates (NO3) are not toxic; ammonium (NH4) is. |

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| http://www.qacps.k12.md.us/cms/teachers/sci/ecounit/foodchain.jpg | http://www.qacps.k12.md.us/cms/teachers/sci/ecounit/Pyramid.gif |
| 11. The arrows in the food chain above     A. Point to the predators.      B. Show the path of energy through the food chain.      C. Show the path of oxygen through the food chain.      D. Point to the primary consumers.    **Explanation**: The arrow shows the path of energy from the food source to the eater. In the case of the plants, the arrow from the sun shows that this is where plants get their energy.      12. The deer in the food chain is the      A. Decomposer      B. Producer      C. Primary Consumer      D. Secondary Consumer    **Explanation**: Primary consumers eat producers (plants); they are herbivores. The food chain shows the deer as eating plants. The arrow from the plants to the deer shows that deer get their energy from plants.      13. The giraffes in the pyramid are      A. Decomposers      B. Producers      C. Herbivores      D. Carnivores    **Explanation**: Herbivores eat plants, and in the pyramid, giraffes are shown as eating trees. They are thus primary consumers or herbivores.      14. Each triangle in the energy pyramid gets smaller because      A. The organism’s habitat area is smaller.      B. The lion is the top of the food chain.      C. Energy is lost as it moves up through the food chain.      D. The lion requires less carbon dioxide than the layers below.    **Explanation**: As energy is passed up a food chain, some of the energy is lost to heat, body activity, and waste (feces). The smaller triangles as you move up the energy pyramid show that some energy is lost. Of all the energy that started with the trees, only a small amount makes it to the lion.      15. The trees in the pyramid and plants in the food chain are examples of      A. Decomposers      B. Producers      C. Herbivores      D. Carnivores    **Explanation**: The trees and plants are producers because they produce their own food through photosynthesis. | |
| http://www.qacps.k12.md.us/cms/teachers/sci/ecounit/foodweb.gif | |
| 16. Which organism in the web above is a secondary consumer?     A. squirrel      B. mouse      C. herbivorous insect      D. fox    **Explanation**: Secondary consumers eat other consumers. Foxes eat many consumers (rabbits, mice, birds, etc.). The other 3 organisms listed are primary consumers because they all eat producers (plants).      17. Which organism serves as a food source for the greatest number of organisms?     A. toad      B. mouse      C. herbivorous insect      D. rabbit    **Explanation**: There are 4 arrows leading away from herbivorous insects, indicating that they are eaten by 4 organisms.  Mice have 3 arrows; they are eaten by 3 organisms. Rabbits are eaten by 2 organisms, and toads are eaten by only snakes.      18. Based on the web above, what will happen to snakes if toads decrease in population?       Snakes will      A. Be unaffected since they can eat other organisms.      B. Decrease in population since their primary food source is in decline.      C. Increase in population since there will be less competition for food.      D. Start eating rabbits.    **Explanation**: Toads are only one of 6 food sources for snakes shown in this food web. Since there is nothing in the web that indicates toads are a primary food source, we can assume that when toads decline, the snakes will eat more of the other 5 food sources. | |

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