Biogeochemical cycle webquest—Ch 3, lessons 3 & 4 (Withgott) Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 10/12/2015

Carbon cycle (3.4)

1. <http://thecarboncycledio.weebly.com/the-carbon-cycle-steps.html>

1 Carbon enters the atmosphere as **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** from respiration (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)  and \_\_\_\_\_\_\_\_\_\_\_\_ (burning).

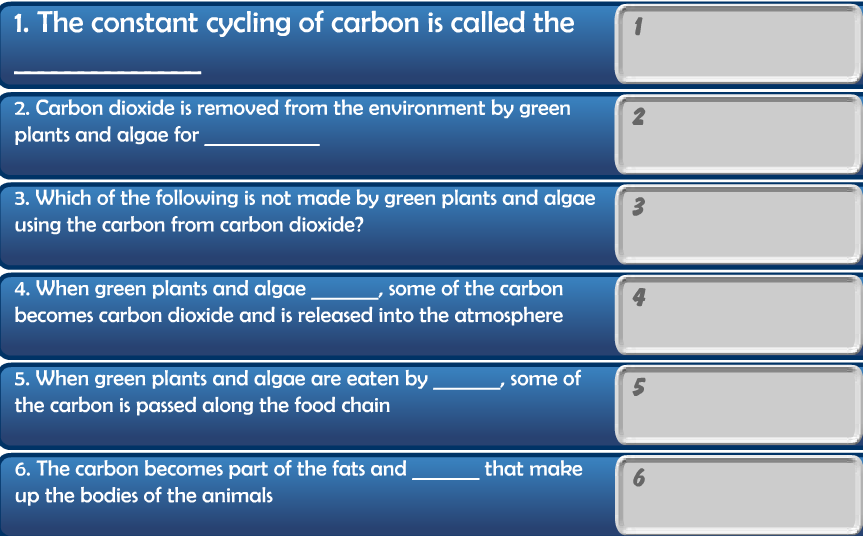
2 Carbon dioxide is absorbed by pr\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (life forms that make their own food e.g. plants) to make **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in \_\_\_\_\_\_\_\_\_\_\_\_\_synthesis . These producers then put off the gas o\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

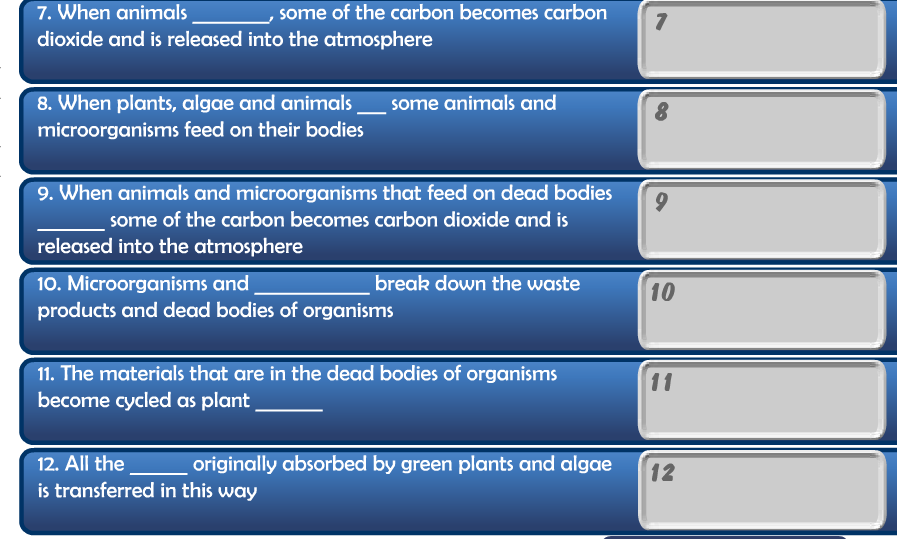
3 Animals feed on the plants, thus passing the carbon compounds along the \_\_\_\_\_\_\_\_\_\_\_\_\_\_. Most of the carbon these animals consume however is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as **carbon \_\_\_\_\_\_\_\_\_\_\_ ­­­­­­­­­­­­­­­­­­.** This is through the process of breathing, also called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . Breathing serves the needs of all the body’s cells, because they produce carbon dioxide during cell r\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The animals and plants then eventually \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

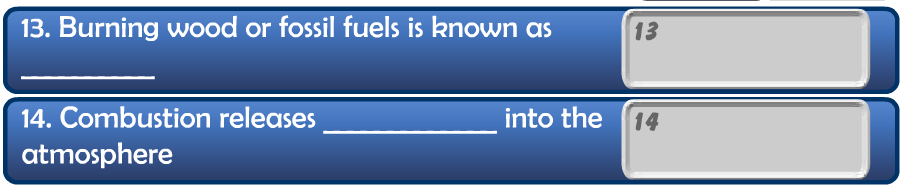
4 The dead organisms (dead animals and plants) are eaten by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in the ground. The carbon that was in their bodies is then returned to the atmosphere as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. In some circumstances the process of decomposition is **prevented**. The decomposed plants and animals may then be available as **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in the future for burning, also known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. <http://footprints-science.co.uk/quizzes.php?module=54&section=1&type=The_carbon_cycle&quiz=drag&subjectarea=Biology%201&difficulty>

Study the C cycle, then run key points at this website (on top bar), then try the quiz and drag and drop activities. When you’ve gotten every answer correct, you’ll be given a confirmation. Keep trying, then when you’re sure you know all the answers under “drag and drop”, fill in the blanks below.







1. <http://serc.carleton.edu/eslabs/carbon/6a.html>

Read through the information about the ability of the ocean to serve as a carbon sink, then answer the questions below.

1. Which areas of the ocean are absorbing more CO2 from the air? List all that apply

cold northern oceans [CORRECT]

warm equatorial(tropical) waters [INCORRECT]

cold southern oceans [CORRECT]

1. Which general areas of the oceans have low amounts of CO2 diffusing into sea surface waters? Check all that apply.

cold southern oceans [INCORRECT]

cold northern oceans [INCORRECT]

warm equatorial(tropical) water [CORRECT]

1. True or False. Check the statements below that are true.

More CO2 diffuses and dissolves in colder sea surface water and less CO2 diffuses and dissolves in warmer water [CORRECT]

Sea surface waters have become slightly warmer as the climate warms. If this continues, you would expect concentrations of CO2 in the atmosphere to decrease.

1. <http://www.sumanasinc.com/webcontent/animations/content/carboncycle.html>

Watch/listen to this animation, then complete the questions below.

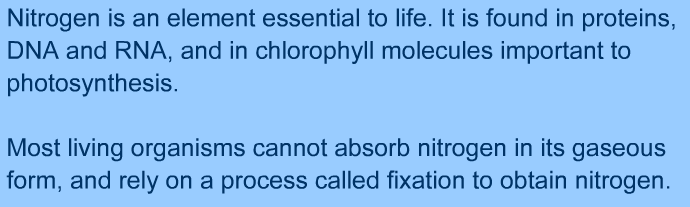
|  |  |
| --- | --- |
|  | 1. This figure shows that most of the earth’s carbon is found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and in marine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  2. True or False. The majority of C on earth has not been actively cycling for over 200 million years when deposited as either fossil fuels or marine sediments. |
| 3. Most actively cycling C in terrestrial (land) ecosystem is released from soil microbes and other organisms (biota) via cell r\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   1. 4. Two human activities resulting in the increasing concentrations of CO2 are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Before the industrial revolution initiated burning of fossil fuels, the equilibrium concentration of carbon dioxide in the atmosphere was likely about \_\_\_\_\_\_\_\_\_\_\_\_\_ parts per million. | 5 The line above is zig zagged because in winter, cell respiration’s replacement of carbon dioxide exceeds \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ removal.  6 The reason climate scientists are concerned about increasing CO2 concentrations is that the earth tends to (?increase, decrease?) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as they rise. Hence, CO2 is called a g\_\_\_\_\_\_\_\_\_\_\_\_\_ gas. |
| 13  8  7 Climate scientists are concerned warming of oceans might upset the ocean conveyer belt that now allows the CO2 removed by marine organisms like diatoms & foraminopherans to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | 11  10  12  9  14 |
| 15 Increased CO2 warms the atmosphere, in turn inhibiting the ability of the North Atlantic to absorb CO2 & allow its sequestration into sediment, thus further raising CO2 concentrations and even further raising average global temperature. What type of feedback loop does this set of events demonstrate: Negative or positive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |

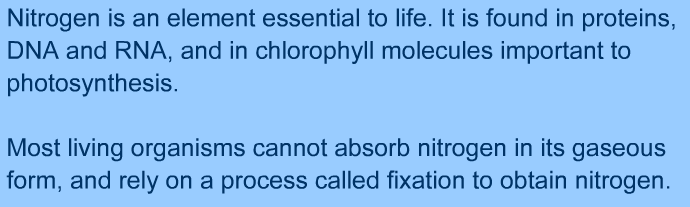
Nitrogen Cycle

1. <http://www.pbslearningmedia.org/asset/lsps07_int_nitrogen/>

Run this animation to learn about the nitrogen cycle, then answer these questions.

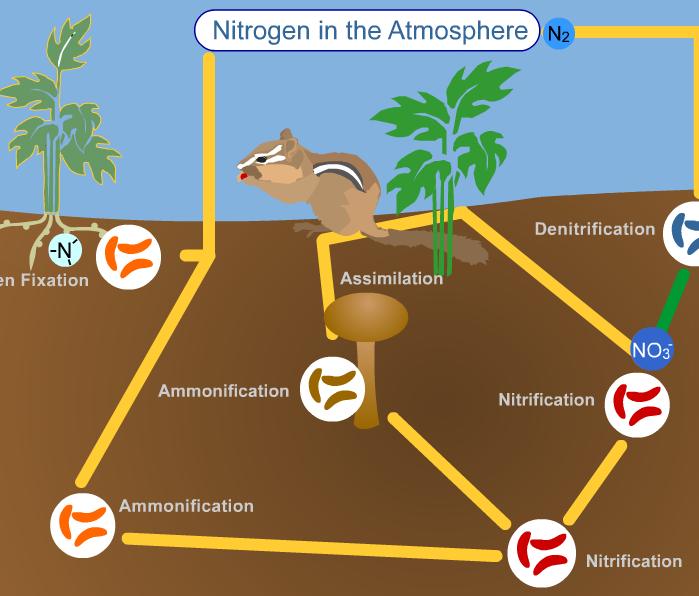
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_ , & \_\_\_\_\_\_\_.

1 

2 

Nitrogen \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3

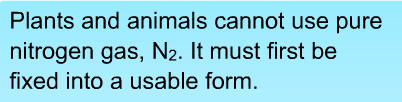
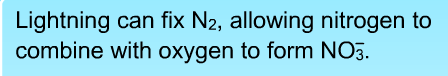
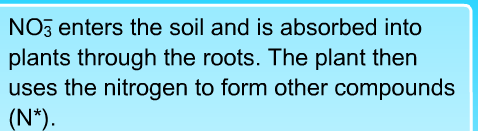
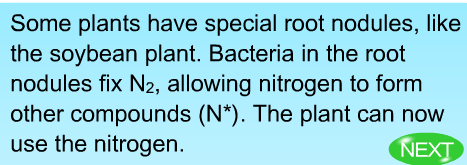
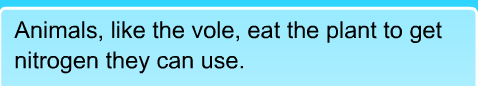
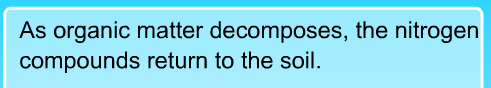
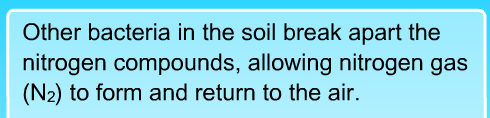


4 Humans farm the same soil repetitively, faster than nitrogen fixing bacteria can replace the nitrates required by plants. This requires the use of chemicals called f\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which are made artificially in chemical factories via an energy-expensive process called the Haber process. W/o fertilizer, yields of food per acre would be far lower.

iii \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by other soil bacteria converts nitrates back into N2 gas.

ii Animals & decomposers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ N out of proteins, DNA, & RNA in foods. By metabolism, they break food down proteins, DNA, & RNA, then rebuild their own according to their own genetic instructions

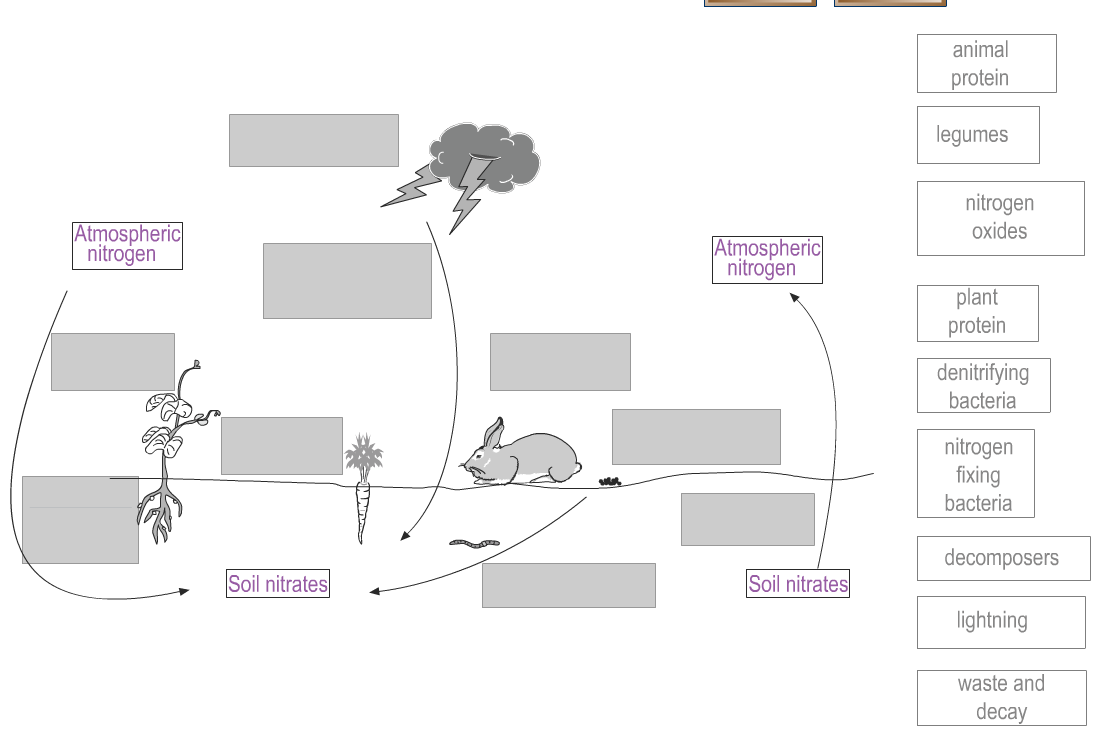
i Bacteria in soil or legumes \_\_\_\_ N to a form other organisms can use. \_\_\_\_\_\_\_\_\_\_ are plants w/ roots contain Nitrogen fixing bacteria.

1. <https://www.classzone.com/books/ml_science_share/vis_sim/em05_pg20_nitrogen/em05_pg20_nitrogen.swf> Run animation, then answer questions below.
2. 
3. 
4. 
5. 
6. 
7. 
8. 

\_\_\_\_\_\_\_\_\_ via denitrification.

F. <http://www.wignallandwales.co.nz/NDSWB/Sample-files/6G1b--Nitrogen-cycle-diagram.htm>

Study the nitrogen cycle, then attempt to fill in the nitrogen cycle. When you’ve correctly identified answers, fill them into the chart below.



i

g

h

f

e

d

c

b

a

8

6

5

2a

3

7

2b

4

1

G. <https://www.superteachertools.us/jeopardyx/jeopardy-review-game.php?gamefile=34443#.Vhvp2uxVhHw>

1 The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ is the movement of nitrogen between the abiotic & biotic factors within the environment.

2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a bacterial process that is able to change N2 gas into forms (ammonium and nitrate ions) that producers like photosynthetic bacteria, plants, and algae can use.

3 Plants take fixed N, in the form of nitrate ions, out of soil to make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_ & \_\_\_\_\_\_\_.

4 Animals get their fixed nitrogen out of their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, like plants they ate.

5 An abiotic source of fixed nitrogen is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ during storms.

6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of dead organisms returns fixed nitrogen to the soil for reuse by plants.

7What percent of Earth's atmosphere is nitrogen gas? \_\_\_\_\_\_\_\_\_\_\_\_

8 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the roots of plants called legumes can fix nitrogen; other soil \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ carry out denitrification, returning N2 gas to the atmosphere.

Phosphorous cycle

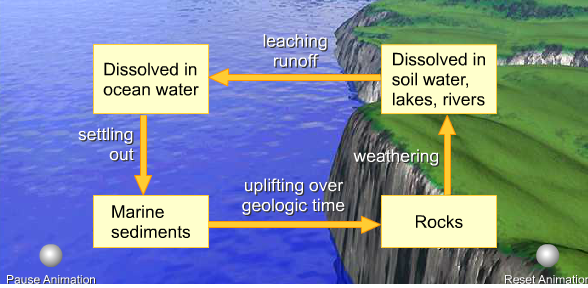
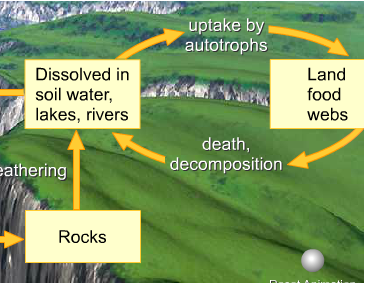
H. <http://www.sumanasinc.com/webcontent/animations/content/phosphorouscycle.html>

run the animation to learn about the phosphorous cycle

1. Two locations of P in all cells is genetic material \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the phosphate heads of the phospholipids in the cell membranes.
2. The main reservoir (storage place) of P in the environment is in minerals that form \_\_\_\_\_\_\_\_\_\_\_\_.
3. P cycles through marine organisms for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of years before settling into sediments at the bottom of the ocean, forming a rock called limestone.
4. Weathering of rocks releases it for use by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which pass the P up to consumers, then decomposers, via the food web.
5. True or False. \_\_\_\_\_\_\_\_ The P cycle is a sedimentary cycle that does not include an atmospheric phase.

I. [**https://www.lcmrschooldistrict.com/roth/PowerPoint\_Lectures/chapter46/videos\_animations/phos\_anim.html**](https://www.lcmrschooldistrict.com/roth/PowerPoint_Lectures/chapter46/videos_animations/phos_anim.html)

run to learn about the P cycle

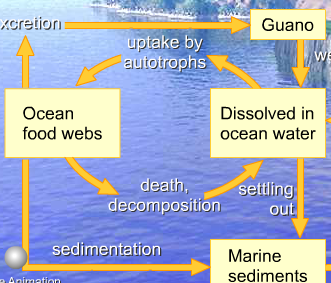
1

3

4

3

2



6

1

5

7. True or False. \_\_\_\_\_\_\_\_ Excessive runoff of P from fertilizer used by humans can damage ocean and fresh water ecosystems by causing algal blooms. This is because N and P, both found in fertilizer, are the limiting factor for producer growth in both aquatic and terrestrial ecosystem.

Water cycle

[www.educationsoutheast**water**.com.au/**game**/natural-**water**-**cycle**.htm](http://www.educationsoutheastwater.com.au/game/natural-water-cycle.htm)

run to learn about the water cycle

<http://www.discoverwater.org/blue-traveler/>

run to learn about the water cycle

<http://player.discoveryeducation.com/views/hhView.cfm?guidAssetId=087777c8-4ff0-45d2-878f-e7cd90f7ee19>