

Pond Matter Paths

Trace how carbon, water, and nitrogen cycle through a pond ecosystem.

LS.5.a "matter moves through ecosystems via the carbon, water, and nitrogen cycles;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Write C, W, or N in the margin beside each sentence that describes how carbon, water, or nitrogen moves. Some sentences may have more than one letter.

Matter on the Move

- ① At the edge of a pond, reeds, algae, insects, fish, and bacteria are connected by moving matter. During daylight, algae take carbon dioxide from air and water. Using sunlight, they build sugars that contain carbon. Snails eat algae, so carbon becomes part of snail bodies. A fish may eat a snail, transferring that carbon again. When organisms release carbon dioxide during cellular respiration, or when decomposers break down dead material, carbon can return to the water or air.
- ② Water also travels through the pond community and its surroundings. Sunlight can cause pond water to evaporate into water vapor. As vapor cools, it condenses into clouds and later falls as precipitation. Reed roots absorb water from wet soil, and water moves through the plants. Some leaves release water vapor through transpiration. Animals obtain water by drinking or eating, then return it through waste, breathing, or decomposition. Water can also flow from the pond into a stream, carrying dissolved materials.
- ③ Nitrogen follows a different route because most organisms cannot use nitrogen gas directly from the air. Certain bacteria in soil or water change nitrogen gas into forms that plant roots can absorb. Reeds and algae use this nitrogen to build proteins and other molecules. Feeding moves nitrogen from plants or algae to animals. When animals produce waste or die, decomposers release nitrogen compounds. Other bacteria can change some of these compounds back into nitrogen gas, returning nitrogen to the atmosphere.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What happens to carbon after a snail eats algae and then a fish eats the snail?

2 Describe two ways water leaves animals and returns to the ecosystem.

3 Trace nitrogen from the atmosphere to a plant and then to an animal.

4 How do the two groups of bacteria described in the passage help move nitrogen through the cycle?

3 YOUR TURN _____ Your own words

Create three labeled arrow sketches of matter moving through a forest ecosystem, one panel each for carbon, water, and nitrogen. Include at least four stops in each path, then write one sentence comparing how the three materials move.

		
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PART 1 • READ AND MARK

Write C, W, or N in the margin beside each sentence that describes how carbon, water, or nitrogen moves. Some sentences may have more than one letter. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What happens to carbon after a snail eats algae and then a fish eats the snail?	Carbon moves from the algae to the snail, then from the snail to the fish.
2	Describe two ways water leaves animals and returns to the ecosystem.	Animals return water through waste and breathing. Decomposition can also return water after an organism dies.
3	Trace nitrogen from the atmosphere to a plant and then to an animal.	Bacteria change nitrogen gas from the atmosphere into forms plant roots can absorb. Plants use the nitrogen, and animals receive it by eating plants or algae.
4	How do the two groups of bacteria described in the passage help move nitrogen through the cycle?	One group changes nitrogen gas into forms plants can absorb. Another group changes nitrogen compounds back into nitrogen gas that returns to the atmosphere.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1, Carbon: carbon dioxide in air → oak tree → rabbit → decomposer → carbon dioxide in air. Panel 2, Water: rain → soil → oak tree → deer → water vapor from breathing. Panel 3, Nitrogen: nitrogen gas → soil bacteria → oak tree → deer → decomposers → soil nitrogen compounds → bacteria → nitrogen gas. Feeding and decomposition move all three materials through organisms, while breathing and bacterial changes can return materials to the air or soil.

Accept equivalent pathways that accurately show matter moving among organisms and nonliving parts of the ecosystem. For the open task, check that each panel includes a complete, scientifically reasonable path and labeled arrows.