

Pond Connections

Track matter, energy, and ecosystem relationships.

LS.5 "The student will investigate and understand that biotic and abiotic factors affect an ecosystem. Key ideas include matter moves through ecosystems via the carbon, water, and nitrogen cycles..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline statements that describe matter or energy moving, circle each named producer, consumer, or decomposer, and write A above each abiotic factor.

Life at the Pond Edge

- ① At the edge of a pond, sunlight warms the water and reeds. Sunlight, water, soil, temperature, and dissolved minerals are abiotic, or nonliving, factors. Reeds, algae, insects, fish, frogs, fungi, and bacteria are biotic factors. These factors affect one another. If a long dry period lowers the water level, fish may lose shelter and oxygen. Fewer fish can change the food choices of herons. A pond ecosystem includes both living things and the nonliving conditions around them.
- ② Plants and algae are producers because they use sunlight to make food. They take in carbon dioxide from air or water and use carbon to build sugars and tissues. When an insect eats algae, carbon-containing matter moves to the insect. A frog that eats the insect receives that matter too. Water also moves through the pond. It evaporates, forms clouds, falls as precipitation, and can enter the pond as runoff. Organisms need water and return some water to the environment.
- ③ Energy enters the pond when producers capture sunlight. In a food web, arrows show energy moving from the organism eaten to the eater. A fish may eat insects and algae, while a heron may eat fish and frogs. An energy pyramid shows that less energy is available at each higher feeding level, so producers form its wide base. Decomposers, such as fungi and bacteria, break down dead organisms and wastes. They return nutrients, including nitrogen compounds, to soil or water, where producers can use them again.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What are two effects a long dry period could have on fish and herons at the pond?

2 Trace the path of carbon-containing matter from algae to a frog.

3 According to the passage, describe one path water can take before it returns to the pond.

4 How does a food web show energy movement, and why do producers form the wide base of an energy pyramid?

3 YOUR TURN _____ Your own words

Invent a small ecosystem, such as a field, forest, or tide pool. In 4 to 5 sentences, identify two abiotic factors, name a producer, two consumers, and a decomposer, use arrows to show a two-step energy path, and explain how one kind of matter cycles and how one abiotic change could affect the system.

PART 1 • READ AND MARK

Underline statements that describe matter or energy moving, circle each named producer, consumer, or decomposer, and write A above each abiotic factor. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What are two effects a long dry period could have on fish and herons at the pond?	Fish may lose shelter and oxygen. Fewer fish can change the food choices of herons.
2	Trace the path of carbon-containing matter from algae to a frog.	Algae are eaten by an insect, and the insect is eaten by a frog. Carbon-containing matter moves from algae to insect to frog.
3	According to the passage, describe one path water can take before it returns to the pond.	Water can evaporate, form clouds, fall as precipitation, and enter the pond as runoff.
4	How does a food web show energy movement, and why do producers form the wide base of an energy pyramid?	Food web arrows point from the organism eaten to the eater. Producers form the wide base because less energy is available at each higher feeding level.

PART 3 • YOUR TURN (SAMPLE ANSWER)

On a rocky shore, sunlight and salt water are abiotic factors. Sea lettuce is a producer, periwinkle snails and crabs are consumers, and bacteria are decomposers. Energy moves sea lettuce → snail → crab. When bacteria break down wastes and dead organisms, nitrogen compounds return to the water and can be used by sea lettuce. If salt water becomes much warmer, some organisms may be stressed, changing the food choices of crabs.

Accept equivalent wording that accurately follows the passage. For the open response, accept any realistic ecosystem model that includes all required roles, an energy path with correctly directed arrows, a plausible matter cycle, and a reasonable abiotic effect.