Pond in Balance

Trace how changes move through a pond ecosystem

FB.6.3 "Obtain, evaluate, and communicate information to explain relationships that exist between abiotic and biotic components of an ecosystem. Explain how changes in biotic and abiotic components affect the balance of an ecosystem over time."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two changes in nonliving conditions and circle two responses by living things. Draw an arrow from each underlined change to a response it helps cause.

A Pond Through a Changing Summer

1. At a pond beside a farm, water level and temperature help shape the lives below the surface. Sunlight reaches underwater plants, which release oxygen into the water during photosynthesis. Oxygen also enters the pond from the air. Insect larvae shelter among the plants, and small fish eat many of the larvae. Herons hunt the fish along the shore. A healthy pond is not a place where every population stays the same size. Its balance depends on organisms and physical conditions changing within ranges that allow these feeding and shelter relationships to continue.

2. During a hot, dry stretch, the pond's water level dropped and its shallow edges grew warmer. Warm water holds less dissolved oxygen than cool water. Some underwater plants stranded at the edge died, removing shelter for insect larvae. Bacteria breaking down the dead plants used oxygen, lowering the amount available to fish even further. Fish crowded into deeper water, where conditions were cooler. With fewer fish near shore, herons had to spend more time hunting. The drought changed physical conditions first, but its effects spread through the pond's living community.

3. Later, a heavy storm washed fertilizer from the farm into the pond. The added nutrients fueled a rapid increase in algae. Thick algae blocked sunlight from reaching underwater plants, so fewer plants grew beneath the surface. When the algae died, bacteria decomposed them and used dissolved oxygen. Fish struggled in water with little oxygen, and herons found less prey near the shore. A strip of grasses planted between the farm and pond could trap some nutrient-rich runoff during future storms. That would reduce the chance of another large algae increase, although recovery would still take time.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did warmer water affect where fish gathered during the dry stretch? Trace the link through oxygen.

2. How did the death of underwater plants change a nonliving condition in the pond?

3. Trace a chain of effects from fertilizer entering the pond to a change in fish conditions.

4. How could planting grasses between the farm and pond affect the pond during future storms?

3 YOUR TURN

Your own words

Suppose trees along the pond are removed, allowing more sunlight to warm the shallow water. In four or five sentences, predict a chain of effects on a nonliving condition and two kinds of organisms from the passage, then suggest one action that could reduce the impact. Make clear which relationship comes from the passage and which effects you are predicting.

ANSWER KEY

Pond in Balance

HIGH SCHOOL · FB.6.3

PART 1 · READ AND MARK

Underline two changes in nonliving conditions and circle two responses by living things. Draw an arrow from each underlined change to a response it helps cause. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did warmer water affect where fish gathered during the dry stretch? Trace the link through oxygen.	**Warmer shallow water held less dissolved oxygen. Fish crowded into deeper, cooler water.**
2	How did the death of underwater plants change a nonliving condition in the pond?	**Bacteria decomposed the dead plants and used dissolved oxygen, leaving less oxygen in the water.**
3	Trace a chain of effects from fertilizer entering the pond to a change in fish conditions.	**Fertilizer added nutrients that increased algae. After the algae died, bacteria decomposed them and used dissolved oxygen, leaving fish in water with little oxygen.**
4	How could planting grasses between the farm and pond affect the pond during future storms?	**The grasses could trap some nutrient-rich runoff before it reached the pond, reducing the chance of another large algae increase.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

If the trees were removed, extra sunlight could warm the shallow water. The passage states that warm water holds less dissolved oxygen than cool water. I predict that fish might move to deeper water, leaving herons with fewer fish to hunt near shore. Planting new shade trees could limit warming as they grow.

Accept other supported cause-and-effect chains that connect a nonliving change to living organisms. For Part 3, the proposed action should address the predicted impact, and the response should distinguish a passage-based relationship from a prediction.