Two Ponds, Two Stories

Use pond data to test explanations for population and biodiversity changes.

B.LS2.2 "Use mathematical representations as evidence to support and revise explanations about factors affecting biodiversity and populations in ecosystems."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the volunteer's claim, circle table values that test it, and label two useful comparisons 1 and 2. Use your marks to judge which factors may explain the changes.

What Changed at Pond A?

(1) Two neighborhood ponds offer a test of explanations for changing life in an ecosystem. Students surveyed each pond in a mild summer and again in a warmer summer. They used the same counting methods each time. Frog counts estimate one population; the number of aquatic invertebrate species is one measure of biodiversity. Dissolved oxygen is measured in milligrams per liter.

(2) During the warmer summer, rain washed fertilizer from a newly landscaped lot into Pond A, but not Pond B. Fertilizer can fuel algal growth. When algae die, decomposers use oxygen as they break down the algae. A volunteer argues that warm weather alone caused the losses at Pond A. Compare the two ponds before accepting that explanation.

POND SURVEYS

Pond	Summer	Frogs (estimated)	Invertebrate species	Oxygen (mg/L)
A	Mild	80	12	8
A	Warmer	30	6	3
B	Mild	75	11	8
B	Warmer	68	10	7

(3) The table lists frog estimates and species recorded in each survey, along with average oxygen for each summer. A larger decline at Pond A would make runoff worth investigating, but the data cannot prove runoff caused the changes. Warm weather could affect ponds differently. Repeated surveys and measurements of algae and fertilizer would help separate possible causes.

2 ANSWER WITH EVIDENCE

Use the passage

1. Calculate the change in estimated frog population at each pond. How does the comparison help you evaluate what happened at Pond A?

2. How did the number of invertebrate species change at each pond? Use the numbers to compare the change in this measure of biodiversity.

3. Compare the oxygen changes at the two ponds. How could the process described in the passage help explain Pond A's frog decline?

4. The volunteer says warm weather alone caused Pond A's losses. Use numbers from both ponds to explain why you would revise or qualify that claim.

3 YOUR TURN

Your own words

A neighbor predicts that raising Pond A's oxygen back to 8 mg/L will restore its frog population to 80. In three or four sentences, use at least two numerical comparisons from the table to evaluate this prediction and describe one observation that could test it.

Two Ponds, Two Stories

PART 1 · READ AND MARK

Underline the volunteer's claim, circle table values that test it, and label two useful comparisons 1 and 2. Use your marks to judge which factors may explain the changes. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Calculate the change in estimated frog population at each pond. How does the comparison help you evaluate what happened at Pond A?	**Pond A fell by 50 frogs, from 80 to 30; Pond B fell by 7, from 75 to 68. The much larger decline at A suggests investigating a factor specific to that pond.**
2	How did the number of invertebrate species change at each pond? Use the numbers to compare the change in this measure of biodiversity.	**Pond A fell from 12 species to 6, a loss of 6. Pond B fell from 11 to 10, a loss of 1. This measure of biodiversity declined much more at A.**
3	Compare the oxygen changes at the two ponds. How could the process described in the passage help explain Pond A's frog decline?	**Average oxygen fell by 5 mg/L at A, from 8 to 3, but by only 1 mg/L at B, from 8 to 7. Fertilizer could have fueled algae whose decomposition used oxygen, potentially affecting frogs at A.**
4	The volunteer says warm weather alone caused Pond A's losses. Use numbers from both ponds to explain why you would revise or qualify that claim.	**Both ponds had a warmer summer, but A lost 50 frogs and 6 invertebrate species while B lost 7 frogs and 1 species. A pond-specific factor such as runoff is worth considering, although the comparison does not rule out warm weather affecting the ponds differently.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Pond A had an estimated 80 frogs when oxygen averaged 8 mg/L, but only 30 when oxygen averaged 3 mg/L. At Pond B, oxygen fell from 8 to 7 mg/L while the frog estimate fell from 75 to 68. These comparisons make the prediction reasonable to test, but they do not show that raising oxygen alone will restore 80 frogs. Researchers could measure oxygen and estimate frog numbers repeatedly after restoration.

Accept other accurate calculations or numerical comparisons. Students should treat runoff and oxygen as possible factors, not proven causes, and acknowledge that warmer weather may affect the ponds differently.