Pond Pattern Detectives

Use population data to build and evaluate a cause-and-effect argument.

MS-LS2-4 "Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each measurement or count, circle each ecosystem component that changed, and number the sentences that connect evidence to a conclusion about a population.

Changes at Cedar Pond

1. At Cedar Pond, students tracked frogs, dragonflies, and pond plants for six years. In the first three years, tall cattails shaded much of the shallow edge. Each May, students counted calling male chorus frogs at ten listening stations and counted dragonfly larvae with the same kind of net. They also measured water temperature at each station. These repeated measurements gave the class evidence about population patterns instead of relying on a single sighting or a guess.

2. In the fourth year, muskrats moved into the pond and ate many cattail stems. By the next May, plant surveys showed that cattail cover along the edge had fallen from 70 percent to 25 percent. Average shallow-water temperature rose from 18 C to 22 C. At the same listening stations, the frog count dropped from 48 calling males to 19. Dragonfly larvae increased from 36 to 61 per ten net sweeps during those May surveys that year.

3. The class compared Cedar Pond with Willow Pond, a nearby pond where cattail cover stayed near 68 percent. Willow Pond's shallow water remained about 18 C, and its frog count stayed between 44 and 50 calling males. The comparison supports the idea that reduced cattails changed the habitat and were linked to fewer chorus frogs at Cedar Pond. However, it does not prove muskrats were the only cause. Rainfall, disease, or predators could also affect frog numbers, so more years of data would strengthen the argument.

2 ANSWER WITH EVIDENCE

Use the passage

1. What biological component changed at Cedar Pond, and what physical condition changed with it?

2. Use two numbers from the passage to support the claim that reduced cattail cover was linked to fewer chorus frogs. Write one or two sentences.

3. How does the data from Willow Pond strengthen the argument about Cedar Pond?

4. Do the data prove that muskrats were the only cause of the frog decline? Explain using one alternative factor named in the passage.

3 YOUR TURN

Your own words

Use this data: Before a dry summer, a marsh averaged 32 leopard frog tadpoles per survey, water depth was 45 cm, and water temperature was 19 C. Afterward, it averaged 12 tadpoles, depth was 16 cm, and temperature was 24 C. Write exactly three sentences: state a claim, support it with at least two numerical comparisons, and name one limitation or additional evidence that would strengthen your argument.

ANSWER KEY

Pond Pattern Detectives

GRADES 6-8 · MS-LS2-4

PART 1 · READ AND MARK

Underline each measurement or count, circle each ecosystem component that changed, and number the sentences that connect evidence to a conclusion about a population. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What biological component changed at Cedar Pond, and what physical condition changed with it?	**Cattail cover, a biological component, fell from 70 percent to 25 percent. Shallow-water temperature, a physical condition, rose from 18 C to 22 C.**
2	Use two numbers from the passage to support the claim that reduced cattail cover was linked to fewer chorus frogs. Write one or two sentences.	**Cattail cover fell from 70 percent to 25 percent, while calling male chorus frogs fell from 48 to 19 at the same stations. These data support the claim that reduced cattails were linked to fewer frogs.**
3	How does the data from Willow Pond strengthen the argument about Cedar Pond?	**At Willow Pond, cattail cover stayed near 68 percent, water stayed about 18 C, and frog counts stayed between 44 and 50. This comparison supports the link between stable cattails and stable frog numbers.**
4	Do the data prove that muskrats were the only cause of the frog decline? Explain using one alternative factor named in the passage.	**No. Rainfall, disease, or predators could also affect frog numbers, so the data do not prove that muskrats were the only cause.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Lower water depth and warmer water were linked to a decrease in leopard frog tadpoles in the marsh. After the dry summer, depth fell from 45 cm to 16 cm and tadpoles fell from 32 to 12 per survey, while temperature rose from 19 C to 24 C. The data do not show that drought was the only cause, so surveys from more years or similar marshes would strengthen the argument.

Accept claims that connect the physical changes in water depth or temperature to the tadpole population change and cite at least two accurate values. For the limitation, accept another possible cause or a reasonable need for more years, repeated surveys, or comparison sites.