Creek in Balance

Evaluate evidence for stability and change in an ecosystem

HS-LS2-6 "Evaluate the claims, evidence, and reasoning that the complex biotic and abiotic interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the claim about the creek's change, circle two observations that test it, and number two sentences that explain how conditions could affect organisms.

What Changed in the Creek?

1. At a shaded mountain creek, a class counts animals in the same stretch each September. During three ordinary years, trout counts are 34, 31, and 33; minnow counts are 12, 14, and 13. On the same ten rocks each year, they find 120, 114, and 118 mayfly larvae. The water stays near 12 to 14 degrees Celsius, with 8 to 9 milligrams of dissolved oxygen per liter. Mayfly larvae feed on algae attached to rocks, while trout eat the larvae. Shade limits warming, and flowing, cool water provides conditions trout can survive in.

2. After a dry summer, the creek is shallower and slower. In September, its water reaches 19 degrees Celsius and dissolved oxygen falls to 5 milligrams per liter. The class counts 9 trout and 26 minnows in the same stretch, plus 48 mayfly larvae on the same ten rocks. Trout need oxygen-rich water, and mayfly larvae depend on flowing water over submerged rocks. Minnows in this creek tolerate warmer, slower water better than trout do. Reduced flow can therefore affect larvae directly and leave trout with less prey, while the conditions favor minnows.

3. A student claims that drought changed both the number and the mix of organisms in this creek. The counts support that claim: trout and larvae fell sharply, while minnows increased. The temperature and oxygen measurements make a plausible link between drought and trout loss, but the observations alone cannot prove drought caused every change. Construction upstream also began that summer; sediment from it might have covered the rocks and harmed larvae. Comparing similar creeks without construction, and repeating the counts after wetter summers, would help test which explanation better fits the evidence.

2 ANSWER WITH EVIDENCE

Use the passage

1. Does the evidence from the three ordinary years support describing this creek as relatively stable? Use counts and one environmental condition to explain.

2. How could the dry summer lead to fewer trout? Use the measurements and one interaction between organisms in your reasoning.

3. A student says drought must have caused the entire drop in mayfly larvae. How strong is that claim? Explain using evidence and another possible cause from the passage.

4. Another student says the creek stayed stable because the minnow count rose. Evaluate that claim using the changes in the animal counts.

3 YOUR TURN

Your own words

Suppose beavers build a dam upstream, turning part of the monitored stretch into a deep, slow pond. Make a claim about how the three animal groups might change, explain two linked effects of the new conditions, name an observation that could test your claim, and give one other possible explanation for that observation.

Creek in Balance

PART 1 · READ AND MARK

Underline the claim about the creek's change, circle two observations that test it, and number two sentences that explain how conditions could affect organisms. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Does the evidence from the three ordinary years support describing this creek as relatively stable? Use counts and one environmental condition to explain.	**Yes. Trout counts stayed between 31 and 34, minnow counts between 12 and 14, and mayfly larva counts between 114 and 120. Water temperature also stayed near 12 to 14 degrees Celsius.**
2	How could the dry summer lead to fewer trout? Use the measurements and one interaction between organisms in your reasoning.	**After the dry summer, water reached 19 degrees Celsius and dissolved oxygen fell to 5 milligrams per liter, conditions less suitable for trout. Mayfly larvae also declined, leaving trout with less prey.**
3	A student says drought must have caused the entire drop in mayfly larvae. How strong is that claim? Explain using evidence and another possible cause from the passage.	**The claim is plausible but not proven. Flow slowed and larva counts fell from 114 to 120 in ordinary years to 48, but sediment from upstream construction might also have harmed the larvae.**
4	Another student says the creek stayed stable because the minnow count rose. Evaluate that claim using the changes in the animal counts.	**The claim is not supported. Although minnows rose to 26, trout fell to 9 and mayfly larvae fell to 48. The numbers and relative abundance of organisms changed.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

If beavers dam the creek, trout and mayfly larvae might decline while minnows increase. Slower water could warm and hold less dissolved oxygen, making the pond less suitable for trout. Fewer rocks washed by flowing water could mean fewer mayfly larvae for trout to eat. I would compare animal counts and oxygen measurements before and after the dam forms. A dry summer could also lower oxygen and reduce trout, so I would check rainfall records and an undammed creek.

Accept other plausible predictions in Part 3 if the response links changed physical conditions to organisms, proposes a relevant test, and identifies a distinct alternative explanation. Counts from different years need not be identical for the ecosystem to be relatively stable.