Patterns Have Causes

Trace how nonliving conditions shape ecosystem interactions.

S7L4.a "Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each abiotic condition, circle each interaction between organisms, and draw an arrow from each condition to an effect it causes.

Two Habitats, Connected Patterns

1. On a sunny slope in a pine forest, rain soaks into thin soil, but summer heat dries the ground quickly. Pine trees with deep roots continue taking in water, while many shallow-rooted grasses turn brown. Needles shade the soil and provide shelter for insects. Lizards hunt those insects in warm patches. When dry weather lasts, fewer grasses make seeds, so seed-eating mice have less food. The pattern begins with water and temperature, then spreads through organisms that depend on plants or one another.

2. At a nearby marsh, winter flooding creates a different set of interactions. Water covers low ground, and cattails grow where their roots can reach mud rich in nutrients. Snails feed on algae coating cattail stems, and ducks eat some snails. Herons wait in shallow water for fish. If water levels fall early, fish lose places to hide, and herons catch fewer fish. Decomposers break down dead cattails, returning nutrients to the mud. Here, water depth shapes which organisms can feed, hide, and grow.

3. Both ecosystems show that nonliving conditions affect living relationships, but the important conditions differ. In the forest, heat and limited soil water reduce plant growth, which can reduce food for mice. In the marsh, water depth changes shelter and hunting opportunities for fish and herons. Organisms also affect their surroundings. Pine needles shade forest soil, while decomposers enrich marsh mud. An explanation of an ecosystem pattern should name the abiotic condition, describe its effect on an organism, and connect that effect to another relationship.

2 ANSWER WITH EVIDENCE

Use the passage

1. Use the forest example. Explain how a long period of dry weather can affect mice. Include plant growth or seeds in your answer.

2. In the marsh, what happens to fish and herons if water levels fall early?

3. Compare the two ecosystems. How does an abiotic condition shape a pattern in the forest, and how does one shape a pattern in the marsh?

4. Name one way organisms change a nonliving part of either ecosystem. Explain one result of that change.

3 YOUR TURN

Your own words

Choose either a desert after several rainy weeks or a rocky shore during a very low tide. Write 3 sentences explaining a likely ecosystem pattern, using one abiotic condition, at least two organisms, and their relationships.

ANSWER KEY

Patterns Have Causes

GRADE 7 · S7L4.a

PART 1 · READ AND MARK

Underline each abiotic condition, circle each interaction between organisms, and draw an arrow from each condition to an effect it causes. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Use the forest example. Explain how a long period of dry weather can affect mice. Include plant growth or seeds in your answer.	**Dry weather reduces grass growth and seed production, so seed-eating mice have less food.**
2	In the marsh, what happens to fish and herons if water levels fall early?	**Fish lose places to hide, and herons catch fewer fish.**
3	Compare the two ecosystems. How does an abiotic condition shape a pattern in the forest, and how does one shape a pattern in the marsh?	**In the forest, heat and low soil water reduce plant growth and food for mice. In the marsh, water depth changes fish shelter and herons' hunting success.**
4	Name one way organisms change a nonliving part of either ecosystem. Explain one result of that change.	**Decomposers return nutrients to marsh mud, helping keep the mud nutrient-rich for cattails.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

After several rainy weeks in a desert, more water lets annual plants grow and make seeds. Insects use the plants for food, and lizards may find more insects to eat. As plants cover more soil, they can also provide cooler, sheltered spots for small animals.

Accept equivalent cause-and-effect explanations that accurately connect an abiotic condition to an organism and then to another interaction. For the open response, accept either ecosystem if the student includes a plausible, complete chain of relationships.