Roots and Rain

How climate and plant traits shape two nearby habitats

BOT.5 "Students will explore adaptations that allow plants to survive in various habitats. Research plants found in various habitats. Analyze how plants use adaptations for survival in these habitats including extreme habitats..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline clues about temperature and precipitation in each habitat. Circle plant traits that help a plant survive those conditions.

From Desert Wash to Mountain Woodland

1 Before sunrise, a dry wash in the Sonoran Desert feels cool. By afternoon, the exposed ground heats quickly, and summer days can be extremely hot. Rain is scarce over the year, although brief storms sometimes soak the ground. A saguaro cactus has broad, shallow roots that quickly absorb water from a storm. Its pleated stem expands as it stores water, and a waxy surface slows water loss. Spines shade part of the stem and help keep animals from eating it. These traits help a saguaro survive long gaps between storms rather than relying on steady rain.

2 Climb into a higher mountain woodland nearby, and the conditions change. The air is usually cooler, and the woodland generally receives more precipitation than the desert floor. Ponderosa pines have narrow needles with waxy surfaces that limit water loss, even when the air is dry. Their deep roots can reach water stored farther down in the soil. Some shaded spots also support ferns, whose thin leaves lose water readily and need reliably damp conditions. A fern would struggle on the open desert floor, while a young saguaro can be damaged by the woodland's freezing winter nights.

3 Temperature and precipitation help determine which plants can survive in each habitat, but they do not act alone. Shade, soil, and competition also matter. Imagine surveyors examine two equal areas, one on an exposed desert slope and one in a damp woodland clearing. They record fewer kinds of plants on the dry slope than in the clearing. That result does not mean every woodland has more plant species than every desert. It suggests that the cooler, wetter clearing offers growing conditions for species that could not live on the exposed slope. A shift toward hotter, drier weather could change which plants persist there.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do a saguaro's roots and pleated stem help it survive scarce rainfall?

2. How do ponderosa pine needles and fern leaves differ in their ability to handle dry conditions?

3. Why might a fern struggle on the desert floor while a young saguaro could be damaged in the mountain woodland?

4. How does the survey result support a link between climate and plant diversity without proving a rule for every desert and woodland?

3 YOUR TURN

Your own words

Imagine the woodland clearing becomes hotter and receives less rain for many years. Design a plant for those changed conditions using two traits from different plants in the passage. Explain how each trait would help, then predict what might happen to ferns in the clearing and why.

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PART 1 · READ AND MARK

Underline clues about temperature and precipitation in each habitat. Circle plant traits that help a plant survive those conditions. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do a saguaro's roots and pleated stem help it survive scarce rainfall?	**Its broad, shallow roots quickly absorb storm water, and its pleated stem expands to store that water between storms.**
2	How do ponderosa pine needles and fern leaves differ in their ability to handle dry conditions?	**The pine's narrow, waxy needles limit water loss. Ferns' thin leaves lose water readily, so ferns need reliably damp conditions.**
3	Why might a fern struggle on the desert floor while a young saguaro could be damaged in the mountain woodland?	**The desert floor is too dry for a fern's thin leaves, while the woodland's freezing winter nights can damage a young saguaro.**
4	How does the survey result support a link between climate and plant diversity without proving a rule for every desert and woodland?	**The cooler, wetter clearing has more kinds of plants than the dry slope in this survey. Shade, soil, and competition also affect which plants grow, so the result cannot establish a rule for every habitat.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

My imagined plant has a pleated stem like a saguaro and narrow, waxy needles like a ponderosa pine. Its stem expands to store water after rain. Its needles limit water loss during hotter, drier weather. Ferns would probably become less common because their thin leaves need reliably damp conditions.

Accept any two distinct, correctly explained traits from different plants in the passage. The fern prediction should connect reduced moisture to the fern's need for damp conditions.