Climate Shapes Plant Life

Read how temperature and precipitation affect plant communities.

BOT.5.2 "Relate atmospheric factors to biodiversity (e.g., climate as determined by temperature and precipitation)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline clues about temperature and precipitation, circle details about the plants that live in each place, and draw at least one arrow in each paragraph from a climate clue to a related plant detail.

Three Places, Three Plant Communities

1. Stand on a rocky slope in the Sonoran Desert after a summer storm. Rain may fall hard, but long dry stretches follow, and summer days are hot. Some seeds sprout quickly after rain; many plants store water, shed leaves during drought, or grow deep roots. Saguaro cacti, creosote bushes, and short-lived wildflowers can all live here, so a desert is not empty. Yet the lack of steady moisture limits water-demanding plants, and trees rarely form a continuous canopy. The timing of rain and the heat help determine which plant species share this slope.

2. Travel to a coastal temperate rainforest in the Pacific Northwest. Frequent rain and mild temperatures keep the ground moist through much of the year. Tall conifers, such as western hemlock, form a canopy; beneath them, shade-tolerant ferns and shrubs grow. Mosses also cover logs and branches. Because water is available and temperatures are less extreme, plants can grow in several layers, creating different places for species to live. This forest may support many moisture-loving plant species that could not survive on the desert slope. Rainfall alone does not set biodiversity; light, soil, and competition also influence which plants persist.

3. Now climb above the tree line on a high mountain. Snow adds precipitation, but much of that water stays frozen through winter. Low temperatures, strong winds, and a short growing season make it hard for trees to establish. When snow melts, small wildflowers, grasses, and cushion plants grow quickly before frost returns. On exposed ground, the number of plant species may be lower than in sheltered patches where snowmelt keeps soil damp. This contrast shows why the amount of precipitation is not the whole story: its form, its timing, and temperature together shape local plant biodiversity.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do heat and the pattern of rainfall on the desert slope affect which plants can live there?

2. How do rain and temperature help the coastal forest support several layers of plants?

3. Why might a sheltered mountain patch have more plant species than exposed ground nearby?

4. Both the desert slope and the high mountain lack a continuous tree canopy. How do their climate-related limits differ?

3 YOUR TURN

Your own words

Imagine one lowland site that is warm and rainy all year and another that is cool and receives rain only during a short spring. In four sentences, predict how their plant communities might differ, explain the roles of both temperature and precipitation, and name one other factor that could change your prediction.

ANSWER KEY

Climate Shapes Plant Life

HIGH SCHOOL · BOT.5.2

PART 1 · READ AND MARK

Underline clues about temperature and precipitation, circle details about the plants that live in each place, and draw at least one arrow in each paragraph from a climate clue to a related plant detail. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do heat and the pattern of rainfall on the desert slope affect which plants can live there?	**Hot days and long dry stretches favor plants that can store water, avoid drought, or grow quickly after rain. Water-demanding plants are limited.**
2	How do rain and temperature help the coastal forest support several layers of plants?	**Frequent rain and mild temperatures keep water available for tall trees, shrubs, ferns, and mosses to grow in different layers.**
3	Why might a sheltered mountain patch have more plant species than exposed ground nearby?	**Snowmelt keeps the sheltered soil damp, giving more plants access to water during the short growing season.**
4	Both the desert slope and the high mountain lack a continuous tree canopy. How do their climate-related limits differ?	**The desert has long dry stretches and hot days, which limit water-demanding trees. Above the tree line, low temperatures and a short growing season make it hard for trees to establish, even though snow adds precipitation.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

At the warm, rainy site, I predict dense plant cover with many moisture-loving species. At the cool site, I expect more plants that grow during the wet spring and survive drier months. Year-round rain supplies water at the first site, while cooler temperatures and a short wet season limit growth at the second. Soil quality could change either prediction because plants also need nutrients.

Accept predictions that connect both temperature and precipitation to plausible differences in plant communities. Students should recognize that climate influences biodiversity without claiming it determines species counts by itself.