

Name _____

Adapting to Change: How Woody Plants Respond to Environmental Challenges

Open-Ended Response Answer Key

1. The ability of woody plants to regulate their internal temperature is crucial for their survival in extreme environmental conditions. By adjusting leaf orientation or transpiration rate, woody plants can minimize heat stress during heatwaves or reduce the risk of frost damage during cold snaps. This adaptive mechanism allows woody plants to maintain optimal physiological functions and ensure their long-term survival in diverse habitats.
2. Woody plants play a significant role in mitigating pollution by absorbing pollutants from the air and soil, thereby improving air and soil quality. Through mechanisms such as phytoremediation, woody plants can detoxify their tissues and sequester pollutants, reducing the impacts of human-induced pollution on ecosystems. Additionally, the dense foliage of woody plants can act as a physical barrier, trapping airborne pollutants and enhancing air purification in urban areas.
3. Genetic diversity within woody plant populations is essential for their adaptation to changing environmental conditions and the maintenance of ecosystem resilience. A diverse gene pool provides the raw material for natural selection to act upon, allowing woody plants to evolve traits that enhance their survival and reproductive success in response to environmental stressors. Moreover, genetic diversity promotes population resilience by reducing the risk of genetic bottlenecks and increasing the likelihood of long-term survival in dynamic environments.
4. Woody plants employ various strategies to cope with drought conditions, including physiological, anatomical, and behavioral adaptations. Physiologically, woody plants can reduce water loss through transpiration by closing stomata or increasing water uptake efficiency. Anatomically, they may have deep root systems that allow them to access water stored deeper in the soil or develop specialized tissues to store water during dry periods. Behaviorally, woody plants may shed leaves or enter dormancy to conserve water and minimize water loss, ensuring their survival in arid environments.

