

Name _____

Why Do Plants Need Carbon Dioxide to Grow

Open-Ended Response Answer Key

1. In photosynthesis, sunlight is captured by chlorophyll and serves as the energy source for the process. Water is drawn up from the ground through the plant's roots and provides hydrogen ions (H⁺) and electrons. Carbon dioxide from the air enters the plant through stomata on leaves and stems. These three ingredients work together: sunlight energizes chlorophyll, which converts carbon dioxide and water into glucose and oxygen through a series of chemical reactions. Oxygen is released into the atmosphere as a byproduct.
2. Glucose is produced during photosynthesis and serves as the primary source of energy for plant growth and various metabolic processes. It is also used to create other important compounds, such as cellulose (a component of plant cell walls) and starch (stored for future energy needs). Without glucose, plants would not have the energy or building blocks necessary for growth and survival.
3. Photosynthesis has a significant environmental impact due to the oxygen released during the process. This oxygen is essential for the respiration of humans, animals, and other organisms. It helps maintain oxygen levels in the atmosphere and supports life on Earth. Additionally, photosynthesis removes carbon dioxide from the atmosphere, playing a crucial role in regulating greenhouse gas levels and mitigating climate change.
4. As a botanist studying the effects of carbon dioxide levels on plant growth, I would conduct experiments involving different CO₂ concentrations to observe their impact on plant health and growth rates. I would measure variables like plant height, leaf size, and the number of flowers or fruits produced. I would hope to discover how changes in carbon dioxide levels affect the overall productivity and health of plants, providing insights into the environmental factors influencing plant ecosystems.

