Key Stage 3 Precise Learning Points

BOHUNT EDUCATION TRUST

Unit Number	B4
Unit Title	Plants
Chapter	Plant Growth

Key Scientific Points

1. Roots – absorb water,
2. Flower – reproduction,
3. Leaves – absorb sunlight (chlorophyll in chloroplasts) and allow gases to enter and leave the plant through the stoma
4. Stem – transport of substances.
5. Palisade cell: Where most of the chlorophyll is and site of most photosynthesis
6. Guard cells: make up the stoma allowing gases to enter and leave the cell.
7. Spongy mesophyll layer with air spaces: Allows carbon dioxide to diffuse from the stomata to the palisade cells.
8. Wax cuticle: Prevent water loss and protect against insects
9. Upper epidermis: Protection and transparent to allow light through.
10. Photosynthesis is an endothermic reaction:
    water + carbon dioxide >(energy)> glucose + oxygen.
    $6H_2O + 6CO_2$ >(energy)> $C_6H_{12}O_6 + 6O_2$
11. Photosynthesis is an endothermic reaction; energy must be added to allow the reaction to happen. This energy is in the form of light. The light is absorbed by chlorophyll in the chloroplasts; the chlorophyll then acts as a catalyst to speed up the reaction between water and carbon dioxide.
12. Temperature, light intensity and carbon dioxide concentration affect the rate of photosynthesis.
13. Main producers of food and therefore biomass on Earth.
14. Dependence of life (requiring oxygen) is on ability of photosynthetic organisms such as plants and algae. Animal life evolved long after plants because it took many millions of years for plants to produce enough oxygen to allow animals to respire.
15. Photosynthesis in plants removes CO_2 from the atmosphere and adds O_2 whereas respiration (of animals and plants) removes O_2 and adds CO_2.
16. Root hair cells have large surface areas allowing a greater amount of water to diffuse into them from the soil.
17. Gas is exchanged by diffusion (O_2 and water vapour leave and CO_2 enter) through stomata on underside of leaves.
18. CO_2, O_2, and glucose all dissolve in water, which allows them to diffuse through and between cells.
19. Water evaporates from leaves, lowering the concentration of water in the leaves allowing more water to diffuse into them from the stem. This process continues down the stem and into the roots. The process is called transpiration.
20. Nutrients from the soil dissolve in water and are carried through the plant via transpiration.
21. Virtually all the water absorbed from the soil evaporates from the leaves, only a small fraction is used in photosynthesis.
22. Transpiration streams keeps water moving into and through plants. Water travels in the xylem.
23. Glucose made in photosynthesis is used in respiration (provide the energy for chemical reactions in the plant), to make cellulose (makes plant structural material), oils (energy store in seeds and cell membranes), proteins (enzymes and cell wall proteins) and stored as starch (insoluble).
24. Glucose dissolves in water, which allows it to diffuse through and out of leaf cells and travel around the plant to where it is needed; it travels in phloem.