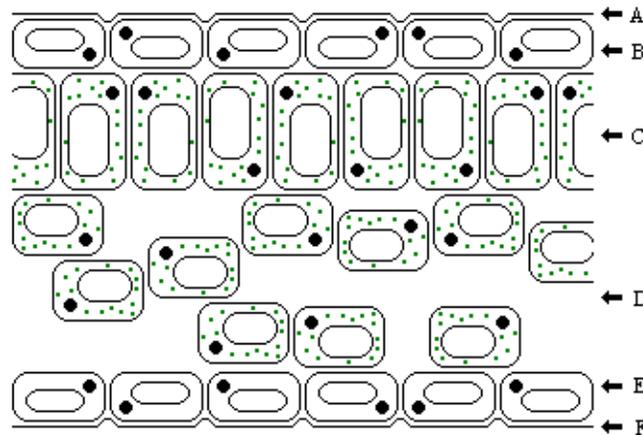


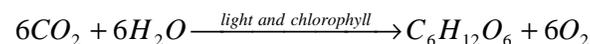
### Biology Revision Notes – Photosynthesis And Transpiration

1. **Root hair cells** have a large surface area to take in water by osmosis, and minerals by active transport.
2. The **transpiration stream** is the flow of water from the roots to the leaves of a plant.
3. **Transpiration** is the loss of water from the leaves of a plant.
4. Water goes through **xylem tissue**, to travel from the roots to the leaves.
5. A plant uses the transpiration stream to:
  - Evaporate the water to keep the plant **cool**.
  - Keep the plant cells turgid to **support** the weight of the plant.
  - Provide the necessary water for **photosynthesis**.
6. Transpiration works fastest in warm, dry, sunny, windy conditions.
7. Water is evaporated through the **stomata**, as well as taking in carbon dioxide and emitting oxygen.
8. Stomata are found on the underside of leaves, and control the rate of transpiration by opening and closing the **guard cells**.
9. The structure of a generic leaf:



- A = Upper cuticle.  
 B = Upper epidermis (no photosynthesis).  
 C = Palisade mesophyll (photosynthesis).  
 D = Spongy mesophyll (photosynthesis).  
 E = Lower epidermis (no photosynthesis).  
 F = Lower cuticle.

10. **Photosynthesis** takes place in **chloroplasts**, which contain **chlorophyll** (a green pigment).
11. Carbon dioxide, light and water are all needed for photosynthesis:



12. Glucose can be stored as **starch**, because starch is insoluble, so water can't accumulate through osmosis.
13. Iodine will turn a leaf a purple/black colour if it contains starch.
14. The limiting factors for photosynthesis are:
  - The concentration of **carbon dioxide**.
  - The **temperature**.
  - The **light intensity**.
15. If a plant is short of water, it will **wilt** as the cells go flaccid.
16. Plants use the following minerals:
  - **Nitrates** – to synthesise DNA and proteins.
  - **Phosphates** – to synthesise DNA and to help photosynthesis and respiration.
  - **Potassium** – to work in enzymes used for photosynthesis and respiration.
17. Plants can suffer from deficiencies of the following minerals:
  - **Nitrates** – causing stunted growth, poor leaf development, and yellow older leaves.
  - **Phosphates** – causing poor root development and purple younger leaves.
  - **Potassium** – causing yellowed leaves with dead spots.