

# The Process of Photosynthesis

## Introduction:

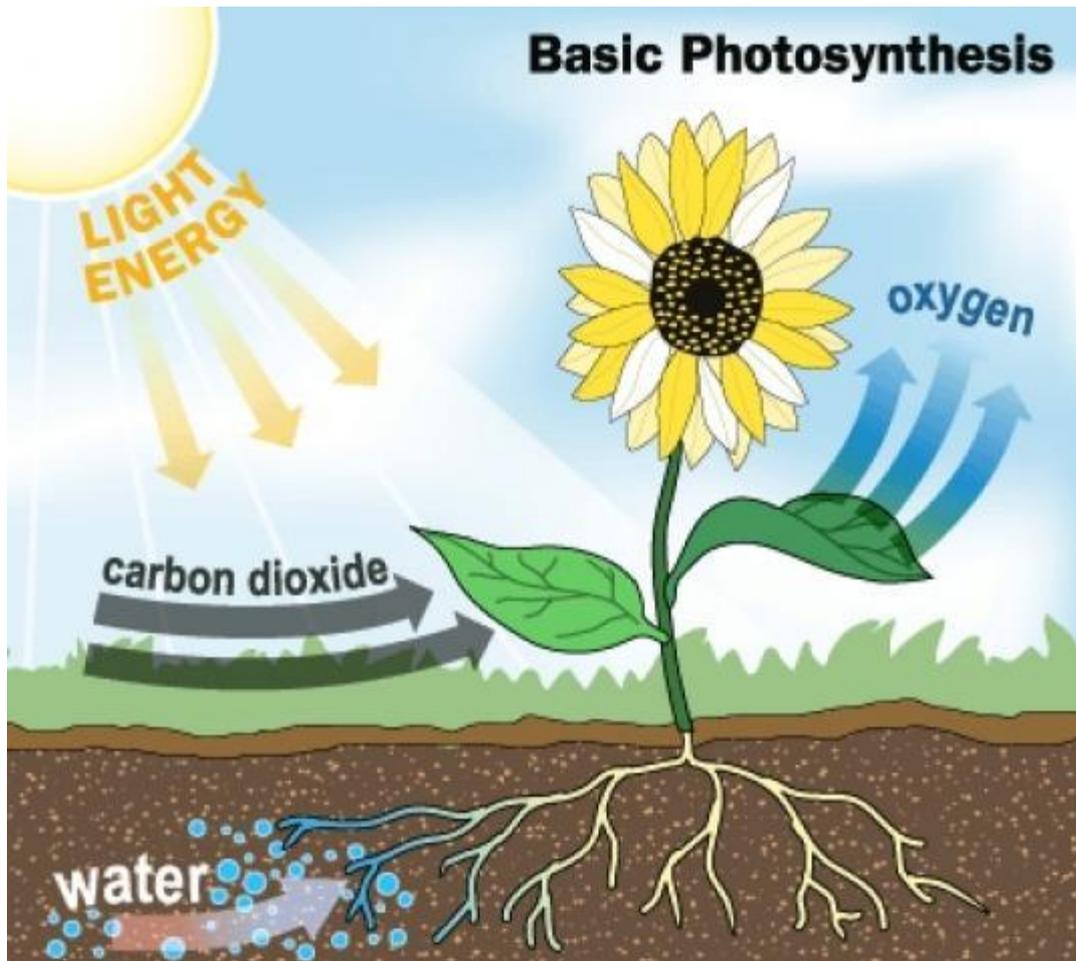
Photosynthesis is the process by which green plants make food using inorganic substances such as light, carbon dioxide and water in the presence of chlorophyll to make organic substances such as glucose and oxygen the by-product.



Carbon dioxide water → glucose oxygen

## Explanation:

The plant gets carbon dioxide from the atmosphere and water from the soil. The light is used to split the water molecule into hydrogen and oxygen. All this must be done in the presence of chlorophyll. The starch is made and stored for further use. For transport it may be placed in the phloem so that it becomes available to the rest of the plant.



## **FOOD GROUPS**

There are six major food groups these are carbohydrates, proteins, fats, mineral salts, vitamins and water. These groups can be further divided into macronutrients that is needed in large quantities such as carbohydrates, proteins and fats and micronutrients needed in small portions these include mineral salts and vitamins.

### **Carbohydrates:**

Provide the body with:

- 1.** Energy
- 2.** Building materials

It is made up of the elements Carbon, hydrogen and oxygen (CHO). Starch and sugars are placed in this group.

There are different types of sugar the first of which is a monosaccharide. This is a one sugar molecule also called a simple sugar. Examples of simple sugars include glucose

and fructose. These are sometime referred to as reducing sugars. Reducing in the sense that reduce Benedict's solution which contain copper 2 sulphate and has a blue colour, however, when it is reduced it becomes brick red (copper 1).

Disaccharides contain two sugar molecules joined together. Examples include:

Lactose → glucose galactose

Maltose → glucose glucose

Sucrose → glucose fructose

These are complex sugars which are also non-reducing sugars. Non-reducing in the sense that they do not reduce Benedict's solution. However if boiled these sugars will breakdown and split into its individual sugars. Sucrose will be broken down into a molecule of glucose and a molecule of fructose if boiled. If Benedict's solution was added to the substance after boiling it would change from a blue to a brick red colour indicating the presence of simple sugars.

Polysaccharides are long chains of simple sugars joined together through condensation reactions. That is eliminating water molecules. Examples include starch and cellulose.

Cellulose makes up cell walls of plants and cannot be digested. It however helps with digestion the peristaltic movement of food down the oesophagus. Cellulose can be found in fruit, honey, yam and potatoes.

## **PROTEIN**

It is made up of carbon, hydrogen, oxygen and nitrogen (CHON). This food group is important because they are:

1. Needed by the body to repair worn out cells.
2. Needed by the body to replace old cells with new cells.

Amino acids are the monomer units that make up protein. There are 20 amino acids essential (cannot be synthesized by the organism) and non-essential (can be synthesized by the organism). Protein can be found in meat, fish, Soya beans, peas, legumes and ground nuts.

A deficiency in protein causes kwashiorkor and marasmus.

## **FATS**

It is made up of carbon, hydrogen and oxygen. It will be broken down into fatty acids and glycerol. The functions of fat include:

1. providing energy
2. insulating
3. digesting fat-soluble vitamins( A, D, E, K)

Fats can be obtained from butter, peanuts and castor oil seeds.

## **MINERAL SALTS**

It may be in the form of many minerals.

### **Calcium ( $\text{Ca}^{2+}$ )**

Use:

- Development of bones and teeth.
- Helps clot blood
- Helps in the control of muscle contraction

Deficiency: Rickets

Source: Milk and cheese.

### **Iron**

Use: helps to manufacture haemoglobin

Deficiency: Anaemia

Sources: liver, kidney and green vegetables

### **Iodine**

Helps to make the chemical thyroxine

Deficiency: Goitre

Sources: cheese, green vegetables and water

## **Phosphorus**

Helps to build bone and teeth

Deficiency: Rickets

Sources: cheese, meat and eggs

## **VITAMINS**

These can be divided into water soluble B and C and fat soluble A, D, E, K.

### **Vitamin A:**

Use: helps surface membranes keep healthy

Deficiency: night blindness-Xerophthalmia

Sources: fish liver oil, green leafy vegetable and butter

### **Vitamin B:**

Use: helps the release of energy from carbohydrate in nerve and muscle cells.

Deficiency: Beri beri

Sources: kidneys, liver, beans and cereals

### **Vitamin C:**

Use: needed for the formation of epithelium and collagen in connective tissue

Deficiency: scurvy

Sources: fruits

### **Vitamin D:**

Use: helps to build up calcium ions and phosphates into bone by helping with absorption of these minerals from the small intestine.

Deficiency: rickets

Sources: bone, egg yolk and butter

## **WATER**

Use: it is present in all body fluids. It also takes part in chemical reactions. It transports blood, hydrolyses food during digestion and cools the body through evaporation.

Deficiency: dehydration and eventually death

Source: food