

### Key Area 3—Photosynthesis

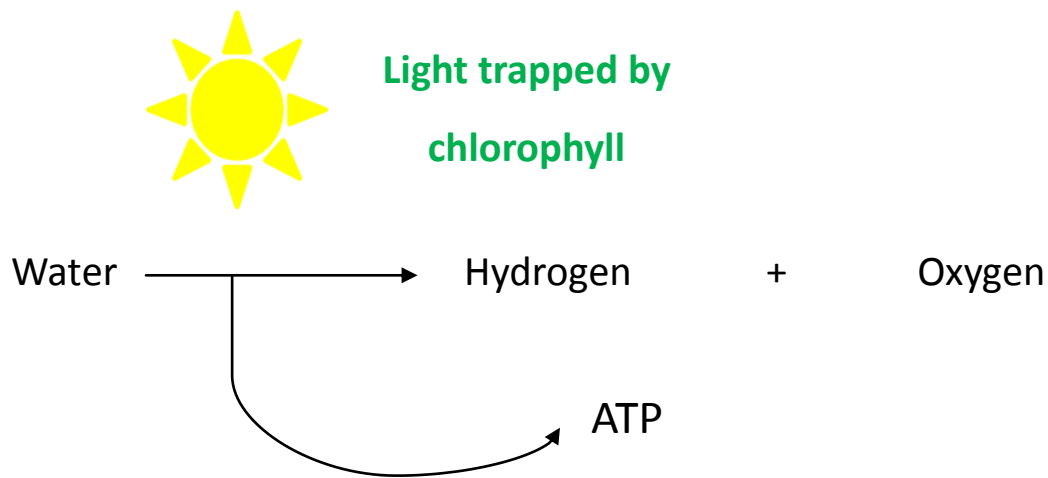
Photosynthesis is a 2-stage process:

#### Light Reactions:

The **light energy** from the sun is trapped by **chlorophyll** in the **chloroplasts** and is **converted into chemical energy** which is used to **generate ATP**.

**Water is split** to produce **Hydrogen** and **Oxygen**.

Oxygen **diffuses** from the cell.

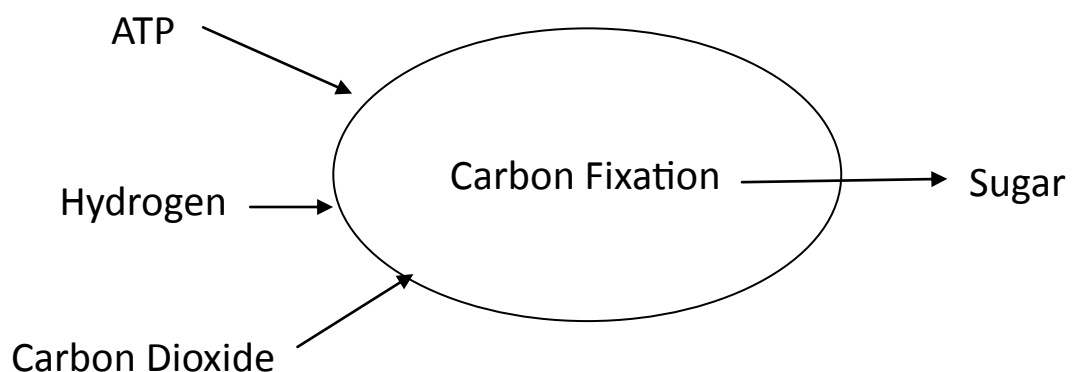


The **Hydrogen** and **ATP** are needed for the 2<sup>nd</sup> stage of photosynthesis.

#### Carbon Fixation:

This is a series of enzyme-controlled reactions.

This stage uses the **Hydrogen** and **ATP** (produced from the light reactions) and **Carbon Dioxide** to produce **Sugar**.



## (b) Uses of the Sugar made in photosynthesis

The chemical energy in the sugar (made during photosynthesis) can be used for:

- Respiration ( to produce ATP/energy)
- Converted into other substances
  - **Starch** (for storage)
  - **Cellulose** ( structural).  
This is used to make plant cell walls.

## (c) Limiting Factors

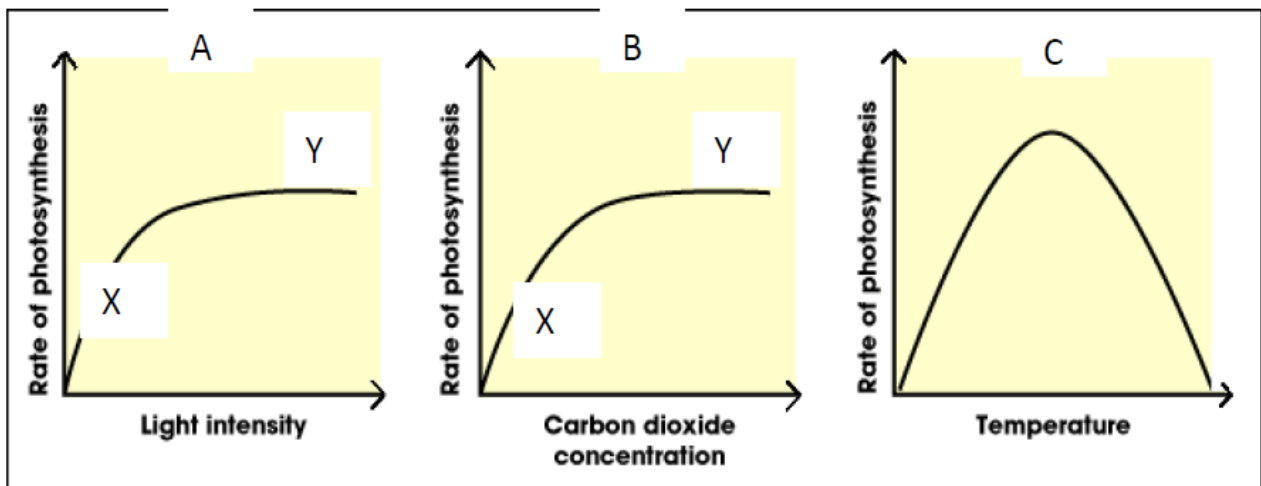
A limiting factor is any factor which, when in short supply, can **slow down/reduce** the **rate of photosynthesis**.

**Carbon dioxide concentration**

**Light Intensity**

**Temperature**

are all limiting factors.



**In graph A :**

At point X, the limiting factor is Low Light Intensity. At point Y, some factor other than light intensity is limiting the rate of photosynthesis, since light intensity is high at this point. Limiting factors at point Y could therefore either be CO<sub>2</sub> concentration or temperature.

**In graph B:**

At point X, the limiting factor is Low CO<sub>2</sub> concentration. At point Y, some factor other than CO<sub>2</sub> concentration is limiting the rate of photosynthesis, since CO<sub>2</sub> concentration is high at this this point. Limiting factors at point Y could therefore either be Light Intensity or temperature.