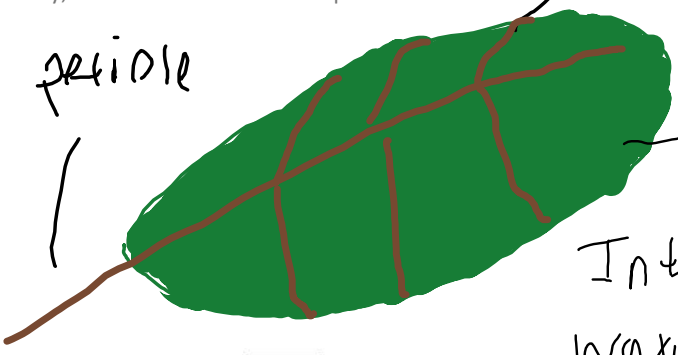
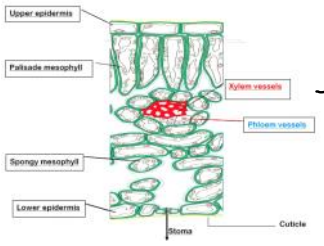
Structure of leaf

Friday, 18 March 2022 10:11 pm



Internal structure of leaf



- waxy cuticle
  - waterproof wax layer
    - ↳ prevent excessive water loss
- xylem vessels
  - ↳ transport H_2O and dissolved mineral salts to the rest of the plant
- epidermis/epidermal cell
  - ↳ protect the cells
- ✓ guard cells
  - ↳ control size of stomata
- stomata
  - Allow diffusion of gases between intercellular air spaces and outside the leaf
- ✓ palisade mesophyll cells
  - ↳ most amount of chloroplasts in leaf
  - ↳ used for photosynthesis
- ✓ spongy mesophyll cells
  - ↳ Irregularly shaped to create intercellular air spaces for efficient diffusion of gases eg: CO_2 and O_2

✓ refers to cells that can photosynthesis

Photosynthesis

Friday, 18 March 2022 10:50 pm

Equation for photosynthesis

Carbon dioxide + water $\xrightarrow[\text{chlorophyll}]{\text{light energy}}$ glucose + oxygen

Carbon dioxide diffuses through the stomata

↳ during wilting, the stomata reduces in size

hence, lesser photosynthesis

↳ Because there is lesser CO_2 conc in intercellular air spaces than in the atmosphere, CO_2 will diffuse into the spongy mesophyll layer

They contain a thin film of moisture for gaseous diffusion of gases

Water

H_2O enters the root via osmosis

Xylem will then transport the water and dissolved mineral salts via transpiration

H_2O finally enters the mesophyll cells via osmosis

After photosynthesis

Saturday, 19 March 2022 12:41 am

Glucose

-used tor immediate cellular respiration

- converted into sucrose to be transported to other parts of the plant in translocation through Phloem
  -excess sucrose converted to starch
- used to form amino acids (glucose and nitrates) which will form new protoplasm
- used to form fats for storage

Oxygen

- used immediately for cellular respiration
- diffuse through the stomata

Why is it importan to photosynthesis

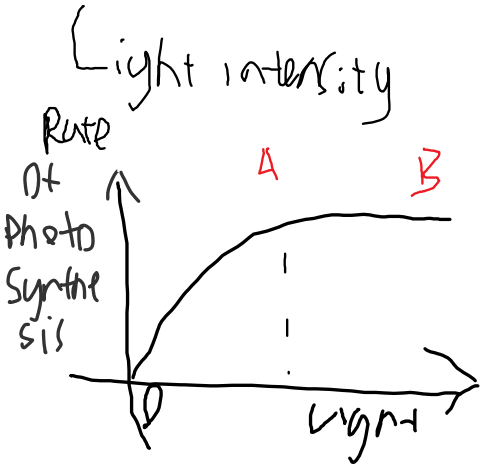
Photosynthesis produce for consumers

- they are producers in the food chain without them everything will die

- photosynthesis provides oxygen and remove carbon dioxide essential for carbon cycle

Factors affecting photosynthesis

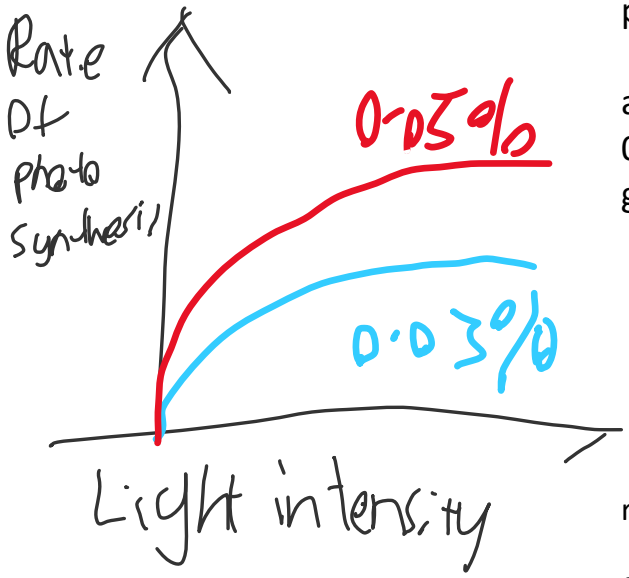
Saturday, 19 March 2022 1:26 am



Light energy is one of the conditions required for photosynthesis.

- As light intensity increases, the rate of photosynthesis increases from 0 to A.
- From 0 to A, light intensity is the limiting factor.
- Beyond A, as light intensity increases, the rate of photosynthesis remains constant
- Beyond A, light intensity is no longer the limiting factor.

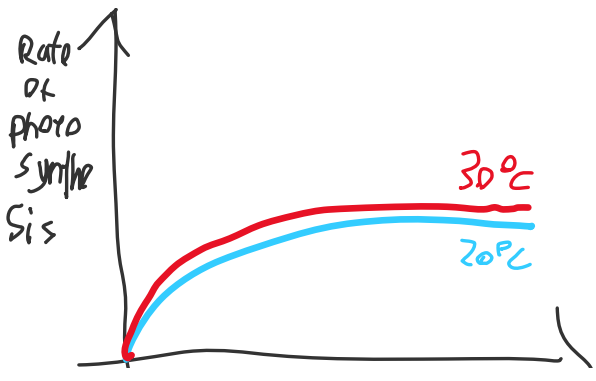
CO_2 concentration



Carbon dioxide is one of the raw materials for photosynthesis.

- When the temperature remains constant and the CO_2 concentration increases to 0.13%, the rate of photosynthesis increases greatly.
- This shows that carbon dioxide is the limiting factor

Temperature

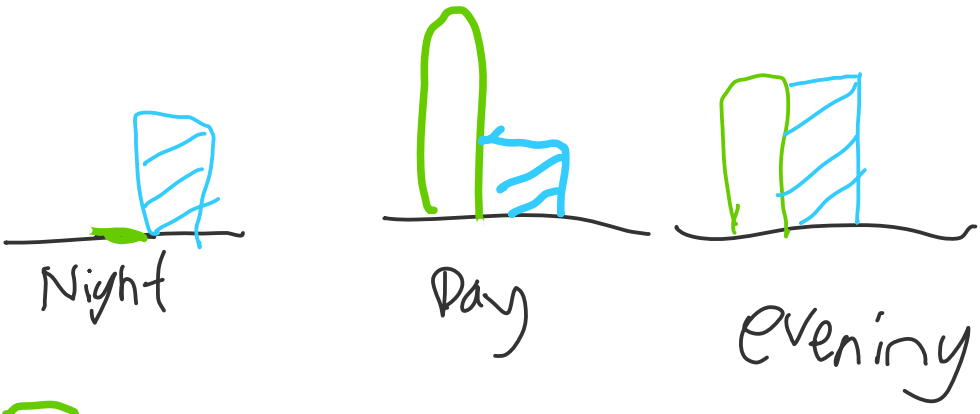


- Photosynthesis is an enzyme-controlled reaction.
- From the graph, increasing the temperature from 20oC to 30oC while keeping the CO_2 concentration constant does not bring about a large increase in rate.
- This shows that temperature is not the limiting factor

Compensation point & Experiments

Sunday, 20 March 2022 7:19 pm

Refers to photosynthesis rate = rate of respiration



rate of photosynthesis

rate of respiration

Testing for starch

Firstly put leaf in boiling water to remove waxy cuticle

Then put it in alcohol to remove epidermal cell

wash leaf in water gently to remove excess alcohol

Then add iodine on the leaf