



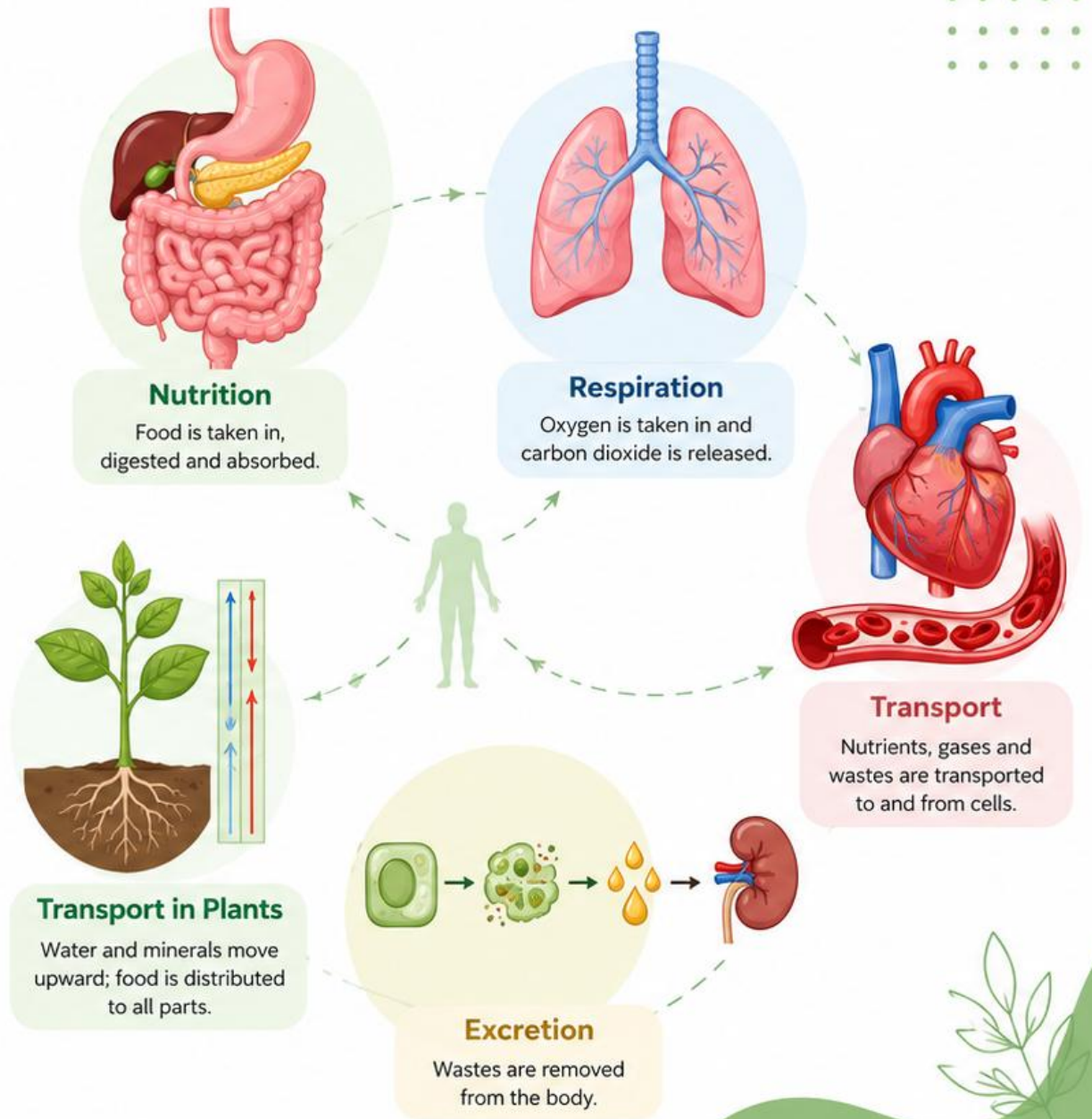
Chapter 5

Life Processes

Understanding nutrition, respiration, transport, and excretion in living organisms.



Class 10 Science Notes



LIFE PROCESSES

HOW DO WE KNOW IT IS ALIVE?

Visible movement alone is not enough.

Living cells show continuous molecular movement.

They repair and maintain their organised structures.



Sleeping animal



Plant



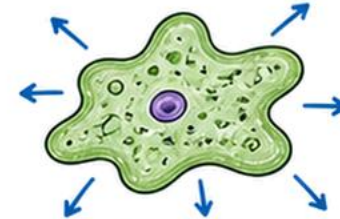
Moving molecules /
cell maintenance

LIFE PROCESSES =
processes that
together maintain
a living organism,
even at rest.

WHY SPECIAL SYSTEMS?

A unicellular organism exchanges materials through its whole surface.

In a multicellular organism, most cells are far from the environment, so diffusion alone is too slow.



Amoeba
(unicellular)



Human being
(multicellular)

FOUR ESSENTIAL PROCESSES



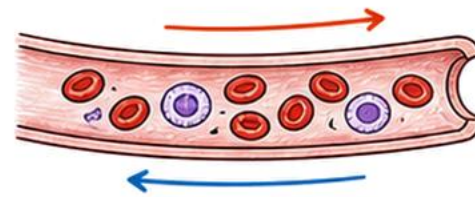
NUTRITION

obtains food, energy
and raw materials



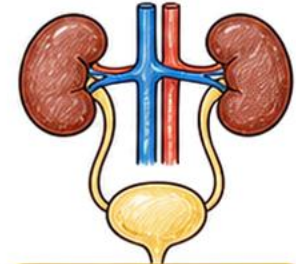
RESPIRATION

releases usable
energy from food



TRANSPORTATION

carries food, gases
and wastes



EXCRETION

removes harmful
metabolic wastes

KEY IDEA: Life requires continuous maintenance, not just visible movement.

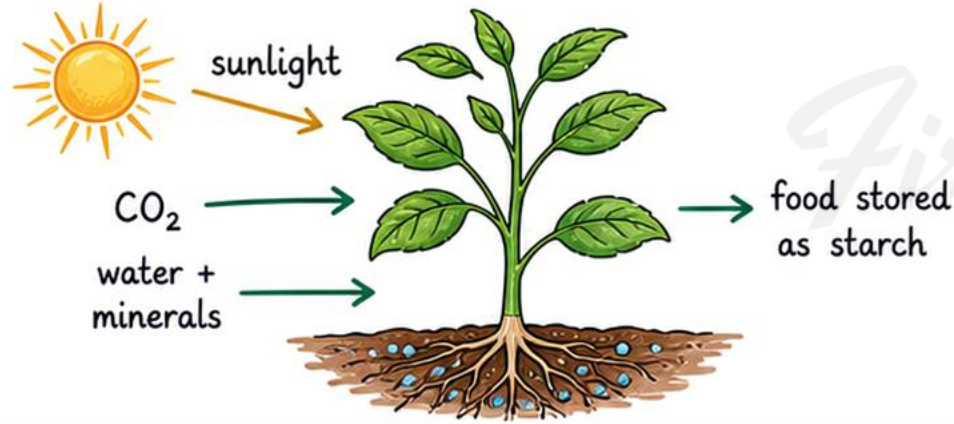
MODES OF NUTRITION

Food supplies energy and raw materials for growth, repair and maintenance.

AUTOTROPHIC NUTRITION

Organisms make complex food from simple inorganic substances such as carbon dioxide and water, using an external energy source.

Examples: Green plants and some bacteria.



HETEROTROPHIC NUTRITION

Organisms obtain complex food made by other organisms and break it into simpler substances with enzymes.

Examples: Animals and fungi.



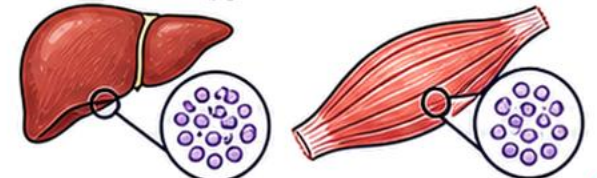
ENZYMES = biological catalysts that help break down complex food.

	AUTOTROPHIC	HETEROTROPHIC
Raw materials:	inorganic	complex organic food
Energy source:	sunlight or chemical energy	energy stored in food
Dependence:	self-feeding	directly or indirectly depends on autotrophs

PLANTS store unused carbohydrate as **STARCH**



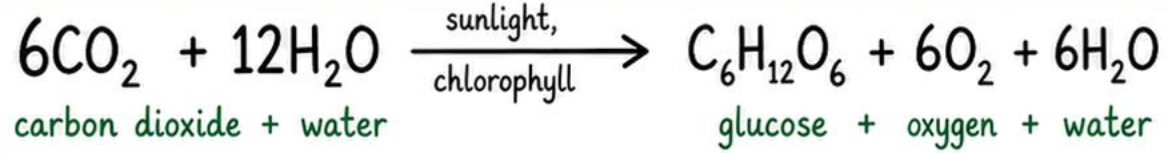
ANIMALS store some food energy as **GLYCOGEN**



KEY IDEA: Nutrition provides both energy and building materials.

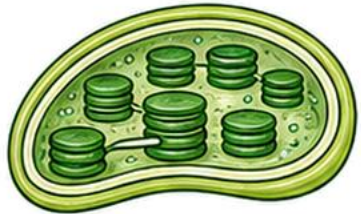
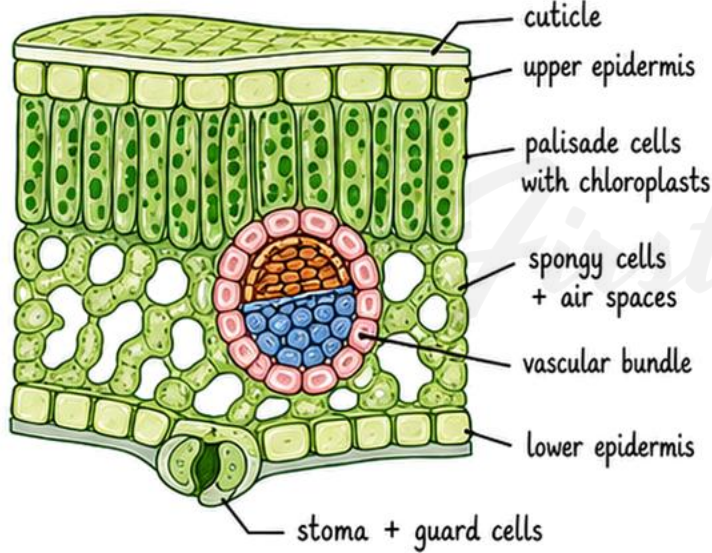
PHOTOSYNTHESIS

Autotrophs convert carbon dioxide and water into carbohydrate using sunlight and chlorophyll.



THREE MAIN EVENTS

- 1 Chlorophyll absorbs light energy.
- 2 Light energy becomes chemical energy; water splits into hydrogen and oxygen.
- 3 Carbon dioxide is reduced to carbohydrate.



chloroplast

Desert plants may take in CO_2 at night and use the stored intermediate during the day.

CHLOROPHYLL TEST

Activity 5.1

1 Destarch a variegated plant: 3 days in darkness.	2 Keep in sunlight for about 6 hours; mark green areas.	3 Boil leaf in water.	4 Heat leaf in alcohol using a WATER BATH — NO OPEN FLAME .	5 Add iodine solution.
				

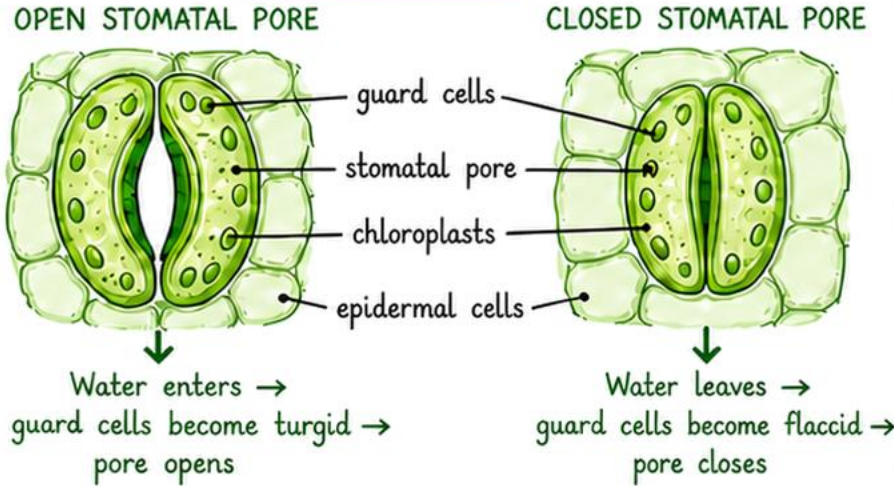
OBSERVATION: Only the previously green parts turn blue-black; other parts stay yellow-brown. The leaf becomes colourless and the alcohol turns green before iodine.

CONCLUSION: Chlorophyll is necessary for photosynthesis and starch formation.

KEY IDEA: Photosynthesis stores light energy as chemical energy in carbohydrate.

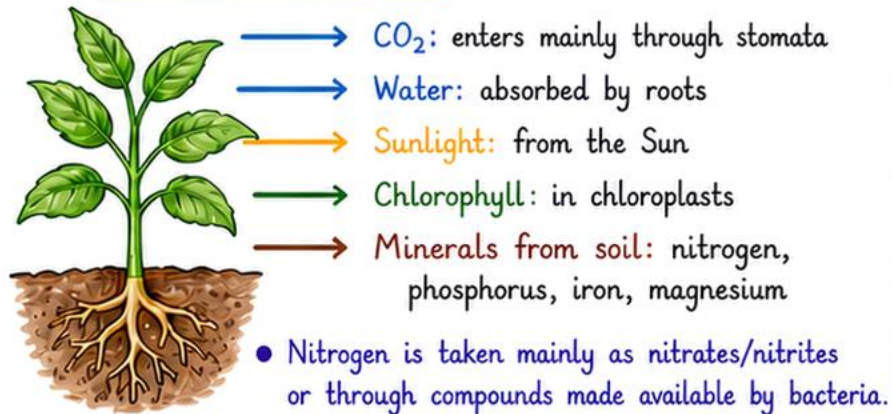
STOMATA AND PHOTOSYNTHESIS TESTS

STOMATA



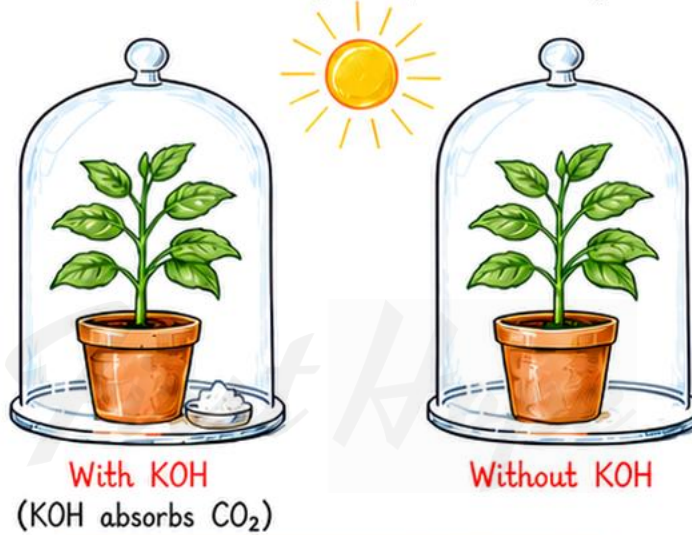
Stomata allow gas exchange but also lose water vapour.

RAW MATERIALS



CO₂ IS NECESSARY

Two identical destarched potted plants in airtight bell jars.



 KOH is corrosive—teacher/lab supervision; avoid skin/eye contact.

SETUP: Destarch 3 days → seal jars → sunlight about 2 hours → iodine test.

OBSERVATION:

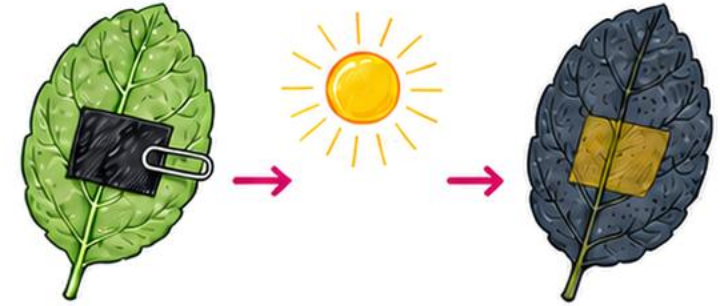
Control leaf turns blue-black.
Leaf from KOH jar shows little or no blue-black colour.

CONCLUSION:

Carbon dioxide is necessary for photosynthesis.

SUNLIGHT IS NECESSARY

A destarched plant leaf partly covered with opaque black paper.



Cover part of the leaf.

Expose to sunlight for about 2 hours.

Iodine test.

OBSERVATION:

Exposed part turns blue-black;
covered part stays yellow-brown.

CONCLUSION:

Light is necessary for starch formation.

KEY IDEA: Stomata balance CO₂ entry with water conservation

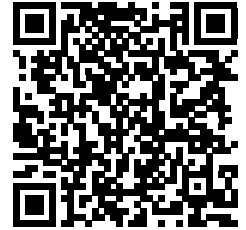


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