

# THE LEAF, PHOTOSYNTHESIS AND WATER CYCLE

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# INTRODUCTION

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- Plants are living organisms that support all life forms on Earth.
- Leaves help plants prepare food through photosynthesis.
- Water is essential for all life processes in plants.
- The water cycle explains how water is continuously reused in nature.
- All these processes are closely interconnected.

# WHAT IS A LEAF?

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- A leaf is a flat, green structure attached to the stem of a plant.
- It is the main organ of photosynthesis.
- Leaves absorb sunlight and exchange gases.
- Most leaves contain chlorophyll which gives them a green colour.



# CHARACTERISTICS OF LEAVES

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- Leaves are usually green due to the presence of chlorophyll.
- They are broad and thin to absorb maximum sunlight.
- Leaves contain veins for transport of water and food.
- They are exposed to air for gas exchange.

# FUNCTIONS OF LEAVES

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- Leaves prepare food for plants by photosynthesis.
- They help in respiration by exchanging gases.
- They remove excess water through transpiration.
- In some plants, leaves store food.

# EXTERNAL STRUCTURE OF A LEAF

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- Leaf base attaches the leaf to the stem.
- Petiole supports the leaf blade.
- Lamina is the broad surface where photosynthesis occurs.
- Veins and veinlets help in transport and support.

# TYPES OF LEAVES

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- Simple leaves have a single leaf blade.
- Compound leaves are divided into leaflets.
- Leaf structure varies among plants.
- These variations help plants adapt to their environment.



# VENATION

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- Venation is the arrangement of veins in the leaf.
- Reticulate venation forms a network of veins.
- Parallel venation has veins running parallel.
- Venation provides strength and transport.

# INTERNAL STRUCTURE OF LEAF

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- Epidermis protects the leaf.
- Mesophyll carries out photosynthesis.
- Xylem transports water and minerals.
- Phloem transports food.

# STOMATA

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- Stomata are tiny pores on leaf surfaces.
- They help in exchange of gases.
- They control water loss through transpiration.
- Guard cells regulate opening and closing.

# PHOTOSYNTHESIS

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- Photosynthesis is the process of food making in plants.
- It uses sunlight, water, and carbon dioxide.
- It occurs in green parts of plants.
- Oxygen is released as a by-product.

# IMPORTANCE OF PHOTOSYNTHESIS

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- Provides food for plants and animals.
- Releases oxygen needed for respiration.
- Maintains atmospheric balance.
- Forms the base of all food chains.

# RAW MATERIALS

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- Carbon dioxide enters through stomata.
- Water is absorbed by roots.
- Sunlight provides energy.
- Chlorophyll traps light energy.

# ROLE OF CHLOROPHYLL

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- Chlorophyll is a green pigment.
- It absorbs sunlight.
- It helps convert raw materials into food.
- Without chlorophyll, photosynthesis cannot occur.

# ROLE OF SUNLIGHT

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- Sunlight supplies energy.
- It drives chemical reactions.
- More light increases photosynthesis.
- Photosynthesis does not occur at night.

# ROLE OF WATER

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- Water provides hydrogen for glucose.
- It is absorbed by roots.
- It reaches leaves through xylem.
- Excess water is removed by transpiration.

# ROLE OF CARBON DIOXIDE

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- Carbon dioxide provides carbon for glucose.
- It enters through stomata.
- Its concentration affects photosynthesis rate.
- It is released during respiration.

# EQUATION OF PHOTOSYNTHESIS

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- Carbon dioxide + Water  $\rightarrow$  Glucose + Oxygen
- Occurs in presence of sunlight and chlorophyll.
- Glucose stores energy.
- Oxygen is released into atmosphere.

# STEPS OF PHOTOSYNTHESIS

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- Absorption of light energy.
- Conversion to chemical energy.
- Splitting of water molecules.
- Formation of glucose.

# PRODUCTS OF PHOTOSYNTHESIS

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- Glucose is formed as food.
- Stored as starch.
- Oxygen is released.
- Energy is used for growth.

# WATER CYCLE

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- Water cycle is continuous movement of water.
- It includes evaporation, condensation, precipitation.
- It maintains water balance.
- Powered by the sun.

# IMPORTANCE OF WATER CYCLE

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- Ensures fresh water supply.
- Maintains climate balance.
- Supports agriculture.
- Recycles water naturally.

# EVAPORATION

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- Water changes into vapour.
- Occurs due to heat.
- Takes place from water bodies.
- Increased by high temperature.

# TRANSPIRATION

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- Loss of water vapour from leaves.
- Occurs through stomata.
- Cools the plant.
- Contributes to water cycle.

# CONDENSATION

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- Water vapour cools down.
- Changes into droplets.
- Forms clouds.
- Occurs at high altitudes.

# PRECIPITATION

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- Water falls from clouds.
- Occurs as rain or snow.
- Provides fresh water.
- Essential for life.

# COLLECTION

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- Water collects in rivers and oceans.
- Some water enters soil.
- Stored as groundwater.
- Cycle continues.

# GROUNDWATER

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- Stored under the earth.
- Formed by infiltration.
- Used by plants and humans.
- Important drinking water source.

# LEAF AND PHOTOSYNTHESIS

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- Leaves contain chlorophyll.
- Broad surface absorbs sunlight.
- Stomata allow gas exchange.
- Leaves are food factories.

# PHOTOSYNTHESIS AND WATER

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- Water is a raw material.
- Hydrogen forms glucose.
- Transpiration removes excess water.
- Continuous supply needed.

# LEAF AND WATER CYCLE

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- Leaves release water vapour.
- Helps cloud formation.
- Plants participate in cycle.
- Forests increase rainfall.

# IMPORTANCE TO LIFE

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- Provides food and oxygen.
- Supports food chains.
- Ensures water availability.
- Maintains life balance.

# DEFORESTATION EFFECTS

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- Reduces photosynthesis.
- Disturbs rainfall.
- Causes climate imbalance.
- Leads to water scarcity.



# CONSERVATION OF PLANTS

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- Plant more trees.
- Protect forests.
- Reduce pollution.
- Promote sustainability.

# CONSERVATION OF WATER

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- Avoid wastage.
- Use rainwater harvesting.
- Prevent pollution.
- Save for future.

# SUMMARY

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- Leaves prepare food.
- Photosynthesis produces oxygen.
- Water cycle recycles water.
- Processes are interconnected.

# CONCLUSION

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- Plants and water support life.
- Understanding nature helps conservation.
- Balance is essential.
- Protect nature for future.

# THANK YOU

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