Photosynthesis and Transpiration

Photosynthesis: The Process of Making Food

Definition:

Photosynthesis is the process by which green plants prepare their own food using carbon dioxide (CO_2), water (H_2O), and sunlight in the presence of chlorophyll.

- 'Photo' means light.
- 'Synthesis' means putting together.

Equation of Photosynthesis:

Carbon Dioxide + Water + Sunlight (Chlorophyll) → Glucose + Oxygen + Water Vapour

Process of Photosynthesis:

Absorption of Water: Plants absorb water from the soil through their roots.

Intake of Carbon Dioxide: Plants take in carbon dioxide from the air through tiny openings called stomata.

Absorption of Sunlight: Chlorophyll (green pigment in leaves) captures sunlight energy.

Formation of Glucose: The absorbed light energy converts water and carbon dioxide into glucose (sugar).

Release of Oxygen: Oxygen is released into the atmosphere as a byproduct through stomata.

Storage of Food: The glucose is converted into starch and stored in fruits, stems, roots, or leaves.

Importance of Photosynthesis:

- Produces oxygen necessary for human and animal respiration.
- Removes carbon dioxide from the atmosphere, purifying the air.
- Forms the base of the food chain as plants serve as primary producers.
- Helps in the growth and energy production in plants.

Photosynthesis Occurs in:

- Leaves, as they contain chlorophyll.
- Any green part of the plant that receives sunlight.

Nighttime Process:

- At night, in the absence of sunlight, plants do not perform photosynthesis.
- Instead, they respire like animals, taking in oxygen and releasing carbon dioxide.

Transpiration: Releasing Water Vapour

Definition:

Transpiration is the process by which plants release water vapor through aerial parts like leaves, stems, and flowers.

Process of Transpiration:

Water Absorption: Roots absorb water from the soil along with dissolved nutrients.

Water Transport: Water moves upward through the plant via the xylem.

Water Loss: Excess water is released as vapor through stomata in leaves.

Cooling Effect: Transpiration helps to cool plants, preventing overheating.

Nutrient Transport: As water moves, it carries essential nutrients from the soil to different parts of the plant.

Importance of Transpiration:

- **Cooling Effect:** Maintains optimal temperature for plant functions.
- **Water Regulation:** Ensures a continuous supply of water.
- **Mineral Transport:** Helps in the movement of nutrients.
- **Maintains Water Cycle:** Contributes to cloud formation and rainfall.

Simple Experiment to Observe Transpiration:

- Take a clean dry plastic bag and cover a branch with leaves on a sunny day.
- Seal the bag around the branch.
- Observe after an hour – water droplets appear inside the bag, indicating water loss through transpiration.