Oxidation in Biology

In biology, oxidation means the loss of electrons or hydrogen from a molecule - often part of an energy-releasing process.
It is not just about oxygen; it mainly involves electron transfer.

Oxidation and reduction always occur together - called a redox reaction.

In Simple Terms:
Oxidation = loss of electrons or hydrogen
Reduction = gain of electrons or hydrogen

Examples of Oxidation in Biology

1. Cellular Respiration
Glucose is oxidized step by step to release energy (ATP).

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy (ATP)}$

- Glucose loses hydrogen (and electrons) -> oxidized
- Oxygen gains hydrogen (and electrons) -> reduced

So:
Oxidation: Glucose -> Carbon dioxide
Reduction: Oxygen -> Water

2. Photosynthesis
In plants, during photosynthesis:

$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

Here, water (H_2O) is oxidized to oxygen (O_2) - it loses electrons.
Oxidation occurs in the light-dependent reactions (when water splits to release oxygen).

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Summary Table:

Process	Substance Oxidized	Substance Reduced	Energy Outcome
Respiration	Glucose	Oxygen	ATP released
Photosynthesis	Water	Carbon dioxide	Glucose formed

Remember:

In biology, oxidation = loss of electrons or hydrogen. It is how cells extract energy from food molecules.