

A redox reaction refers to the chemical reaction where one substance undergoes reduction, while another substance undergoes oxidation. Both processes always occur together.

Oxidation happens when:

- Gaining of oxygen
- Loss of hydrogen
- Loss of electrons
- **Increase in oxidation state**

Reduction happens when:

- Loss of oxygen
- Gaining of hydrogen
- Gaining of electrons
- **Decrease in oxidation state**

How to calculate Oxidation State

From GenieTeach

General Rules For Oxidation State

Rule	Condition	Examples	Oxidation state
1	Neutral elements	H ₂ , Na, Mg, O ₂	0
2	Ions with fixed charge e.g. Group I, II, VII ions and Al	Na ⁺ , Ca ²⁺ , Br ⁻ etc...	Same as charge +1, +2, -1, -2
3	Hydrogen in a compound (with exception)	HCl, H ₂ O, NH ₃ , KOH	+1
4	Oxygen in a compound (with exception)	MgO, Na ₂ O	-2
5	Sum of O.S is same as charge on anion/cation	SO ₄ ²⁻ , CO ₃ ²⁻ , NH ₄ ⁺	Same as charge

Exception in Hydrogen

1. Metal Hydride (e.g. MgH₂)

2. Hydrogen Peroxide

Exception in Oxygen

Hydrogen Peroxide

Examples of Calculating Oxidation State

1. SO₄²⁻

2. SO₂

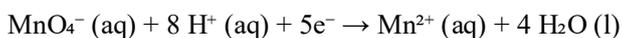
3. KMnO₄

OXIDISING AGENTS

An oxidising agent refers to a reagent that causes another substance to be oxidised.

An oxidising agent itself would undergo reduction instead.

1. Acidified potassium manganate (VII), KMnO_4 is an oxidizing agent. Hence, it will undergo reduction in the reaction.



The oxidation state of manganese decreases from +7 in the manganate (VII) ion to +2 in the manganese (II) ion.

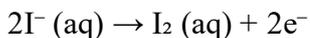
The colour of the solution will turn from purple to colourless.

REDUCING AGENT

A reducing agent refers to a reagent that causes another substance to be reduced.

A reducing agent itself would undergo oxidation instead.

1. Potassium iodide, KI is an reducing agent. It will undergo oxidation in the reaction.



The oxidation state of iodine has increased from -1 in iodide to 0 in iodine.

The colour of the solution will turn from colourless to brown.