



# Redox Reactions with Dr. B

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Exclusive learning content for [channel members](#).

## Key Terms

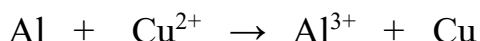
With redox, you must know the vocabulary to be successful. This makes up the core of questions about redox on exams.

The big terms are Oxidation Number, Oxidation, Reduction, Half-Reactions, Reducing Agent, and Oxidizing Agent.

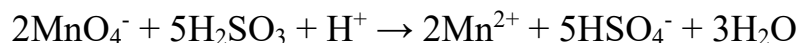
 [Oxidation & Reduction](#)


 [Full Redox Playlist](#)

**Redox Reactions** involve the transfer of electrons from one species to another. In a redox reaction the oxidation numbers change. For example:



or



 [How to tell if a reaction is Redox.](#)

**Species:** an element, ion, or compound that gains or loses electron(s) in a reaction. For example, Fe,  $\text{MnO}_4^-$ ,  $\text{Cu}^{2+}$ ,  $\text{H}_2\text{O}_2$ .

**Oxidation Number:** a number we assign to an atom in order to keep track of how many electrons an atom has gained or lost. This is different from “ionic charge” although they sometimes overlap.

**Oxidation:** when an atom, ion, or molecule *loses* electrons.

**Reduction:** when an atom, ion, or molecule *gains* electrons.

Two different ways to remember this:

LEO the Lion goes GER

Loses Electrons Oxidation

Gain Electrons Reduction

OIL RIG

Oxidation Is Loss (of electrons)

Reduction Is Gain (of electrons)

LEO

Loses  
Electrons  
Oxidation



GER

Gains  
Electrons  
Reduction



**Oxidizing Agent** (oxidant): causes another substance to be oxidized.

**Reducing Agent** (reductant): causes another substance to be reduced.

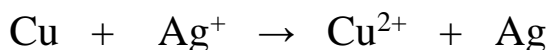
*Reducing agents are always oxidized.*

*Oxidizing agents are always reduced.*

### Half Reaction

Oxidation and reduction always occur simultaneously in a redox reaction.

There will be two half reactions for a redox equation. For example:



Oxidation Half Reaction:  $\text{Cu}^0 \rightarrow \text{Cu}^{2+} + 2\text{e}^-$  (Oxidation because Cu goes from 0 to 2+)

Reduction Half Reaction:  $\text{e}^- + \text{Ag}^+ \rightarrow \text{Ag}^0$  (Reduction because  $\text{Ag}^+$  goes from 1+ to 0)

## Half Reaction Method for Balancing Redox Equations

- 1) Write the [oxidation numbers](#) for each element.
- 2) [Write the half reactions](#) for the species of interest.
- 3) Balance [each half-reaction](#) for:
  - atoms of interest.
  - Oxygen (O) atoms by adding  $\text{H}_2\text{O}$ .
  - Hydrogen (H) atoms by adding  $\text{H}^+$  ions.
  - electrons (charge) by adding electrons.
- 4) Balance the [overall equation for electrons](#) (charge).
- 5) [Add half reactions and simplify](#).

You must get the oxidation number correct! Otherwise: 😞

Half reactions are the hard part. Take your time here.

The rest isn't too bad, just a lot of work.

Some teachers use the Oxidation Number Change Method. It is similar the Half Reaction Method and gives the same answer. However it is not as common.

## Redox Guides

[Introduction to Redox](#)

[Finding Oxidation Numbers](#)

[Writing Half Reactions](#)

Key Terms: Oxidized, Reduced, Oxidizing Agent, Reducing Agent (this guide)

[Balancing Half Reactions](#)

[Matching Electrons, Combining Half Reactions](#)

[Balancing Redox in Basic Medium](#)

[Practice, Practice, Practice](#)

Report errors and suggestions to [DrB@breslyn.org](mailto:DrB@breslyn.org)

