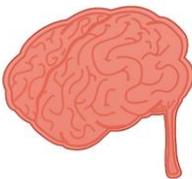


<u>Definition</u> Addition of oxygen OR removal of hydrogen	<u>Definition</u> Addition of hydrogen OR removal of oxygen	<u>Definition</u> Loss of electrons OR increase in oxidation number	<u>Definition</u> Gain of electrons OR decrease in oxidation number
oxidation	reduction	oxidation	reduction
I AM LEO 		Oxidation number of an element eg Zn, O ₂ , S ₈ or C is	Sum of the oxidation numbers in a "molecule" eg H ₂ O, CH ₄ , NaCl, is
Leo (loss of electrons - oxidation)	Ger (gain of electrons - reduction)	zero	zero
Sum of oxidation numbers in a polyatomic ion, eg SO ₄ ²⁻ , Cr ₂ O ₇ ²⁻ , NH ₄ ⁺ , is...	Oxidation number of a simple ion, eg S ²⁻ , Cr ³⁺ , Fe ³⁺ , is...	The oxidation number of O in compounds is...	The oxidation number of H in compounds is...
the charge on that ion	the charge on that ion	-2 (unless a peroxide, -1)	+1 (unless metal hydride, -1)
The oxidation number of F in compounds is...	 RIG(e)	 OIL(e)	Balance atoms - that are not H or O Balance O - add water Balance H - add H ⁺ Balance charge - add e ⁻ to more positive side
-1	reduction is gain (of electrons)	oxidation is loss (of electrons)	balancing half equations

<u>Oxidising agent</u> Acidified orange dichromate $H^+/Cr_2O_7^{2-}$ is reduced to	<u>Oxidising agent</u> Acidified purple permanganate H^+/MnO_4^- is reduced to	<u>Oxidising agent</u> Colourless hydrogen peroxide, H_2O_2 is reduced to	<u>Oxidising agent</u> Very pale orange iron(III) ion Fe^{3+} is reduced to
green chromium(III) ion Cr^{3+}	"colourless" manganese ion, Mn^{2+}	colourless water, H_2O	very pale green iron(II) ion Fe^{2+}
<u>Oxidising agent</u> Pale greeny-yellow chlorine Cl_2 is reduced to	<u>Oxidising agent</u> Orange brown iodine I_2 is reduced to	<u>Oxidising agent</u> Oxygen gas, O_2 is reduced to	<u>Oxidising agent</u> Hydrogen ion, H^+ , eg from acids like HCl or H_2SO_4 is reduced to
colourless Cl^- ion (& pungent smell disappears)	colourless I^- ion	oxide ion O^{2-}	colourless hydrogen gas, H_2
<u>Reducing agent</u> Metals, eg Mg, Zn or Cu are oxidised to	<u>Reducing agent</u> Black carbon, C, is oxidised to	<u>Reducing agent</u> Colourless carbon monoxide gas, CO, is oxidised to	<u>Reducing agent</u> Colourless hydrogen gas, H_2 , is oxidised to
metal ions, Mg^{2+}, Zn^{2+} or Cu^{2+}	colourless CO_2 gas	colourless CO_2 gas	colourless H^+ ion
<u>Reducing agent</u> Very pale green iron(II) ion Fe^{2+} is oxidised to	<u>Reducing agent</u> Colourless bromide ion, Br^- , is oxidised to	<u>Reducing agent</u> Colourless iodide ion, I^- , is oxidised to	<u>Reducing agent</u> Colourless, pungent smelling sulfur dioxide gas, SO_2 is oxidised to
very pale orange iron(III) ion Fe^{3+}	reddish brown bromine, Br_2	orange-brown solution of iodine, I_2 (or grey solid)	colourless sulfate, SO_4^{2-}

<u>Reducing agent</u> Colourless, hydrogen sulphite, HSO_3^- is oxidised to	Increase in oxidation number is	Decrease in oxidation number is	No change in oxidation number eg $\text{Cr}_2\text{O}_7^{2-} \rightarrow$ CrO_4^{2-} , (Cr +6 in both) means that
colourless sulfate, SO_4^{2-}	oxidation	reduction	it is NOT a redox reaction
Redox reaction in which the same element is both oxidised and reduced is called	Oxidising agent is another name for an	Reducing agent is another name for a	Oxidising agents _____ electrons and are _____ in the process
disproportionation	oxidant	reductant	gain reduced
Reducing agents _____ electrons and are _____ in the process	To combine balanced half equations x by factors so that	Oxidation No. / state of N in N_2O_4 is	Oxidises Cu to Cu^{2+} and is reduced to a brown gas
lose oxidised	the electrons will cancel out	+4	Conc. HNO_3
Other colours to know... copper(II) ion Cu^{2+} is	Nitrogen dioxide gas, NO_2 , is	Oxidation No. / state of N in NO_3^- is	Oxidation No. / state of N in NH_4^+ is
blue	brown	+5	-3

<u>Halogens as oxidants</u> Reaction with halides $\text{Cl}_2 + \text{Br}^- \text{ or } \text{I}^-$	<u>Halogens as oxidants</u> Reaction with halides $\text{Br}_2 + \text{I}^-$	<u>Halogens as oxidants</u> Br_2 is not a strong enough oxidising agent to oxidise...	<u>Halogens as oxidants</u> I_2 is not a strong enough oxidising agent to oxidise...
produces Cl^- & Br_2 or I_2	produces Br^- & I_2	chloride	chloride or bromide
Oxidising agents _____ other species and in the process they become _____	Reducing agents _____ other species and in the process they become _____	Colour change Mix H^+ / MnO_4^- & Fe^{2+}	Colour change Mix H^+ / $\text{Cr}_2\text{O}_7^{2-}$ & Fe^{2+}
oxidise reduced	reduce oxidised	purple to colourless (slight pale orange)	orange to green
Formula for the reducing agent sulfite	Formula for the reducing agent hydrogen sulfite	Yellow solid formed when H_2S is oxidised	ClO^- is reduced to ...
SO_3^{2-}	HSO_3^-	sulfur	chloride, Cl^-
Hydrogen peroxide can be oxidised to...	Hydrogen peroxide can be reduced to...	IO_3^- is reduced to _____ (colour) _____ (species)	
water & oxygen	water	orange-brown Iodine, I_2	 No Brain Too Small  CHEMISTRY 