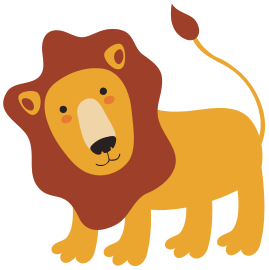
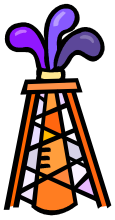
Definition Addition of oxygen OR removal of hydrogen	Definition Addition of hydrogen OR removal of oxygen	Definition Loss of electrons OR increase in oxidation number	Definition Gain of electrons OR decrease in oxidation number
oxidation	**reduction**	**oxidation**	**reduction**
I AM LEO 		Oxidation number of an element eg Zn, O_2, S_8 or C is	Sum of the oxidation numbers in a "molecule" eg H_2O, 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-}, $Cr_2O_7^{2-}$, 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**

Oxidising agent Acidified orange dichromate $H^+/Cr_2O_7^{2-}$ is reduced to	Oxidising agent Acidified purple permanganate H^+/MnO_4^- is reduced to	Oxidising agent Colourless hydrogen peroxide, H_2O_2 is reduced to	Oxidising agent 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+}**
Oxidising agent Pale greeny-yellow chlorine Cl_2 is reduced to	Oxidising agent Orange brown iodine I_2 is reduced to	Oxidising agent Oxygen gas, O_2 is reduced to	Oxidising agent 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**
Reducing agent Metals, eg Mg, Zn or Cu are oxidised to	Reducing agent Black carbon, C, is oxidised to	Reducing agent Colourless carbon monoxide gas, CO, is oxidised to	Reducing agent 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**
Reducing agent Very pale green iron(II) ion Fe^{2+} is oxidised to	Reducing agent Colourless bromide ion, Br^-, is oxidised to	Reducing agent Colourless iodide ion, I^-, is oxidised to	Reducing agent 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 $Cr_2O_7^{2-} \rightarrow CrO_4^{2-}$, (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**

Halogens as oxidants Reaction with halides Cl_2 + Br^- or I^-	Halogens as oxidants Reaction with halides Br_2 + I^-	Halogens as oxidants Br_2 is not a strong enough oxidising agent to oxidise…	Halogens as oxidants 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^+/ $Cr_2O_7^{2-}$ & 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**	