

# 9. Redox Processes

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<b>Keyword</b>	<b>Definition</b>
Activity Series	An ordering of the elements by their reactivity.
Anode	Where oxidation occurs
Battery	Another name for a voltaic cell.
Biological Oxygen Demand	The amount of oxygen used to decompose the organic matter in a sample of water over a specified time period at a specified temperature.
Blooms	Out of control growth of algae generally caused by runoff of fertilisers.
Cathode	Where reduction occurs
Cell Diagram Convention	The scientifically accepted method of drawing the components of a voltaic cell.
Discharged	When ions lose or gain charge to become neutral
Displacement	When a more reactive element takes the place of a less reactive element in an aqueous compound.
Disproportionation	Reaction in which the same element is simultaneously oxidised and reduced.
Dissolved Oxygen	An important indicator of water quality. As pollution increases, dissolved oxygen decreases
Electrochemical Cells	Applications of oxidation and reduction reactions, includes both voltaic and electrolytic cells.
Electrode Potential	The charge separation between the metal and its ions in solution.
Electrodes	Another name for half cell.
Electrolysis	When an electric current is used to drive a chemical reaction which breaks down compounds into their elements.
Electrolyte	A liquid, usually a molten ionic compound or a solution of an ionic compound.
Electrolytic Cell	A cell which uses an external source of electrical energy to bring about a redox reaction that would be non-spontaneous.
Eutrophication	When out of control aquatic plant growth leads to a decrease in dissolved oxygen content of the water.
Galvanic Cell	See Voltaic Cell
Half Cells	A strip of metal in a solution of its aqueous ions. Joined with another half cell it will produce a current due to differing electrode potentials.
Half Equations	Equations showing the electron transfer of one reactant in a redox reaction.
Inert	Electrodes that do not take part in redox reactions.
Oxidant	See Oxidising Agent
Oxidation	The loss of electrons. The gain of oxygen. When there is an increase in the oxidation state of an element.
Oxidation Numbers	Roman numerals which are inserted into the name of an element which correspond to the oxidation state of that element.
Oxidation State	A value assigned to each atom in a compound that is a measure of the electron control or possession it has relative to the atom in the pure element.
Oxidising Agent	The substance being reduced.
Redox Reaction	A chemical reaction in which changes in the oxidation states occur.
Reducing Agent	The substance being oxidised.

Reductant	See Reducing Agent
Reduction	The gain of electrons. The loss of oxygen. When there is a decrease in the oxidation state of an element.
Titre	The volume of solution added from a burette to reach equivalence.
Voltaic Cell	Cells that generate electricity from spontaneous redox reactions.
Winkler Method	A redox titration method used to measure the dissolved oxygen in water and so calculate the biological oxygen demand.

## Higher

Keyword	Definition
Brine	$\text{NaCl}_{(\text{aq})}$
Cell Potential	The potential generated when two half cells are connected together, see electrode potential
Chlor-Alkali	The commercial electrolysis of aqueous sodium chloride.
Electrode Potential	The potential generated when two half cells are connected together, see cell potential
Electromotive Force	The potential difference generated by a voltaic cell.
Electroplating	The process of using electrolysis to deposit a layer of metal on top of another metal or other conductive object.
EMF	Abbreviation of Electromotive Force
Galvanised Iron	When iron has a layer of zinc deposited on its surface to protect against corrosion.
Hydrogen Economy	The potential of hydrogen to be a replacement for fossil fuels and as an energy carrier.
Nernst Equation	Equation used to calculate cell potentials under non-standard conditions (not in IB)
Sacrificial Protection	When a metal has a more reactive metal placed on or around it to protect it from corrosion.
Selective Discharge	When more than one ion could be discharged at an electrode and only one will be.
SHE	Abbreviation of Standard Hydrogen Electrode
Standard Conditions	All solutions with a concentration of $1.00 \text{ mol dm}^{-3}$ , all gases at a pressure of 100kPa, all substances pure, temperature of 298K and if the half cell does not contain a solid metal, platinum is used.
Standard Electrode Potential	The EMF of a half cell when it is connected to a SHE by an external circuit with a high-resistance voltmeter and a salt bridge.
Standard Half-Cells	Half cells under standard conditions
Standard Hydrogen Electrode	The reference standard in electrochemistry. Composed of an acidic solution containing $1 \text{ mol dm}^{-3}$ of $\text{H}^+$ ions with a platinum electrode at standard conditions.
Standard Reduction Potentials	Another name for standard electrode potential, as values are always given for the reduction reaction.