AS91167 Demonstrate understanding of oxidation-reduction
Level 2, 3 Credits (Internal)

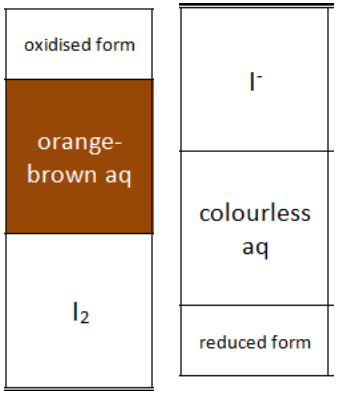
This achievement standard involves demonstrating understanding of oxidation-reduction.

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of oxidation-reduction.	Demonstrate in-depth understanding of oxidation-reduction.	Demonstrate comprehensive understanding of oxidation-reduction.

These revision notes are provided twice, once in colour & once in black and white. There are no guarantees that the colour will print accurately and so you may prefer to print in B&W and colour yourself with colouring pencils. By reading these notes in colour you will find yourself learning these important colours without even trying!

Below are a set of flash cards, one strip of oxidising agents, one of reducing agents. Fold along the middle, glue and cut. Each card has the oxidised and reduced form. Test yourself…..

Orange-brown I_2 is reduced to…… [flip card] ….. colourless I^- etc



Knowledge of the appearance of redox reactants and their products (observations) is required:

Oxidants including, but not limited to:

oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form
colourless gas	orange-brown aq	red-brown liquid / aq	pale yellow gas / aq	colourless aq	colourless aq	pale orange aq	blue aq	colourless aq	purple aq	orange aq	colourless liquid (brown tinge)	colourless aq
O_2	**I_2**	**Br_2**	**Cl_2**	**OCl^-**	**H^+**	**Fe^{3+}**	**Cu^{2+}**	**H_2O_2**	**MnO_4^- / H^+**	**$Cr_2O_7^{2-}$ / H^+**	**Conc. HNO_3**	**IO_3^-**
O^{2-}	**I^-**	**Br^-**	**Cl^-**	**Cl^-**	**H_2**	**Fe^{2+}**	**Cu**	**H_2O**	**Mn^{2+}**	**Cr^{3+}**	**NO_2**	**I_2**
various coloured solids	colourless aq	colourless aq	colourless aq	colourless aq	colourless gas	pale green aq	pinky-orange solid	colourless liquid	colourless aq	green aq	brown gas	orange-brown aq / grey solid
reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form

Reductants including but not limited to:

reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form
silvery grey solid	black solid	colourless gas	pale green aq	colourless aq	colourless aq	colourless gas	colourless gas	colourless aq	colourless aq	colourless aq
Metal e.g. Mg or Zn	**C**	**H_2**	**Fe^{2+}**	**Br^-**	**I^-**	**H_2S**	**SO_2**	**SO_3^{2-}**	**HSO_3^-**	**H_2O_2**
M^{2+} ion *usually*	**CO & CO_2**	**H^+**	**Fe^{3+}**	**Br_2**	**I_2**	**S**	**SO_4^{2-}**	**SO_4^{2-}**	**SO_4^{2-}**	**O_2**
colourless aq	colourless gases	colourless aq	pale orange aq	red-brown aq	orange-brown aq / grey black solid	yellow solid	colourless aq	colourless aq	colourless aq	colourless gas
oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form

Oxidants including, but not limited to:

oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form
colourless gas	orange-brown aq	red-brown liquid / aq	pale yellow gas / aq	colourless aq	colourless aq	pale orange aq	blue aq	colourless aq	purple aq	orange aq	colourless liquid (brown tinge)	colourless aq
O_2	**I_2**	**Br_2**	**Cl_2**	**OCl^-**	**H^+**	**Fe^{3+}**	**Cu^{2+}**	**H_2O_2**	**MnO_4^- / H^+**	**$Cr_2O_7^{2-}$ / H^+**	**Conc. HNO_3**	**IO_3^-**
O^{2-}	**I^-**	**Br^-**	**Cl^-**	**Cl^-**	**H_2**	**Fe^{2+}**	**Cu**	**H_2O**	**Mn^{2+}**	**Cr^{3+}**	**NO_2**	**I_2**
various coloured solids	colourless aq	colourless aq	colourless aq	colourless aq	colourless gas	pale green aq	pinky-orange solid	colourless liquid	colourless aq	green aq	brown gas	orange-brown aq / grey solid
reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form

Reductants including but not limited to:

reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form	reduced form
silvery grey solid	black solid	colourless gas	pale green aq	colourless aq	colourless aq	colourless gas	colourless gas	colourless aq	colourless aq	colourless aq
Metal e.g. Mg or Zn	**C**	**H_2**	**Fe^{2+}**	**Br^-**	**I^-**	**H_2S**	**SO_2**	**SO_3^{2-}**	**HSO_3^-**	**H_2O_2**
M^{2+} ion *usually*	**CO & CO_2**	**H^+**	**Fe^{3+}**	**Br_2**	**I_2**	**S**	**SO_4^{2-}**	**SO_4^{2-}**	**SO_4^{2-}**	**O_2**
colourless aq	colourless gases	colourless aq	pale orange aq	red-brown aq	orange-brown aq / grey black solid	yellow solid	colourless aq	colourless aq	colourless aq	colourless gas
oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form	oxidised form

Oxidants including, but not limited to:

colourless gas	orange-brown aq	red-brown liquid / aq	pale yellow gas / aq	colourless aq	colourless aq	pale orange aq	blue aq	colourless aq	purple aq	orange aq	colourless liquid (brown tinge)	colourless aq
O_2	I_2	Br_2	Cl_2	OCl^-	H^+	Fe^{3+}	Cu^{2+}	H_2O_2	MnO_4^- / H^+	$Cr_2O_7^{2-}$ / H^+	Conc. HNO_3	IO_3^-
is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩	is reduced ⇩
O^{2-}	I^-	Br^-	Cl^-	Cl^-	H_2	Fe^{2+}	Cu	H_2O	Mn^{2+}	Cr^{3+}	NO_2	I_2
various coloured solids	colourless aq	colourless aq	colourless aq	colourless aq	colourless gas	pale green aq	pinky-orange solid	colourless liquid	colourless aq	green aq	brown gas	orange-brown aq / grey solid

Oxidising agents (oxidants) oxidise another chemical, and in the process are reduced themselves. Oxidising agents accept electrons.

Reductants including but not limited to:

silvery grey solid	black solid	colourless gas	pale green aq	colourless aq	colourless aq	colourless gas	colourless gas	colourless aq	colourless aq	colourless aq
Metal e.g. Mg or Zn	C	H_2	Fe^{2+}	Br^-	I^-	H_2S	SO_2	SO_3^{2-}	HSO_3^-	H_2O_2
is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩	is oxidised ⇩
M^{2+} ion (usually)	CO & CO_2	H^+	Fe^{3+}	Br_2	I_2	S	SO_4^{2-}	SO_4^{2-}	SO_4^{2-}	O_2
colourless aq	colourless gases	colourless aq	pale orange aq	red-brown aq	orange-brown aq / grey black solid	yellow solid	colourless aq	colourless aq	colourless aq	colourless gas

Reducing agents (reductants) reduce another chemical, and in the process are oxidised themselves. Reducing agents donate electrons.