

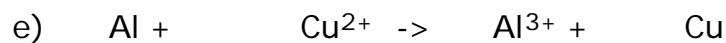
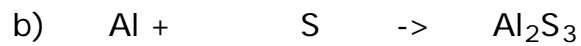
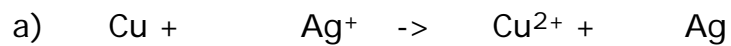
# Balancing Redox Reactions 1 - Notes/W.S.

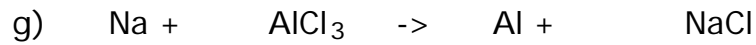
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A redox reaction, or oxidation-reduction reaction, involves two half-reactions; an oxidation half-reaction and a reduction half-reaction.

Some redox reactions can be balanced by inspection.

1) Balance the following redox reactions by inspection. Write down the balanced oxidation and reduction half-reactions.





Answers: a)  $\text{Cu} + 2\text{Ag}^+ \rightarrow \text{Cu}^{2+} + 2\text{Ag}$ ; ox:  $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$ ; red:  $\text{Ag}^+ + \text{e}^- \rightarrow \text{Ag}$ , b)  $2\text{Al} + 3\text{S} \rightarrow \text{Al}_2\text{S}_3$ ; ox:  $\text{Al} \rightarrow \text{Al}^{3+} + 3\text{e}^-$ ; red:  $\text{S} + 2\text{e}^- \rightarrow \text{S}^{2-}$ ; c)  $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ ; ox:  $\text{Mg} \rightarrow \text{Mg}^{2+} + 2\text{e}^-$ ; red:  $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$ ; d)  $\text{Fe} + 2\text{H}^+ \rightarrow \text{Fe}^{2+} + \text{H}_2$ ; ox:  $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$ ; red:  $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$ , e)  $2\text{Al} + 3\text{Cu}^{2+} \rightarrow 2\text{Al}^{3+} + 3\text{Cu}$ ; ox:  $\text{Al} \rightarrow \text{Al}^{3+} + 3\text{e}^-$ ; red:  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$ , f)  $\text{I}_2 + 2\text{Br}^- \rightarrow 2\text{I}^- + \text{Br}_2$ ; ox:  $2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}^-$ ; red:  $\text{I}_2 + 2\text{e}^- \rightarrow 2\text{I}^-$ ; g)  $3\text{Na} + \text{AlCl}_3 \rightarrow \text{Al} + 3\text{NaCl}$ ; ox:  $\text{Na} \rightarrow \text{Na}^+ + \text{e}^-$ ; red:  $\text{Al}^{3+} + 3\text{e}^- \rightarrow \text{Al}$ , h)  $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ ; ox:  $\text{C}^{2+} \rightarrow \text{C}^{4+} + 2\text{e}^-$ ; red:  $\text{Fe}^{3+} + 3\text{e}^- \rightarrow \text{Fe}$ , i)  $2\text{MnO}_2 + \text{H}_2 \rightarrow \text{Mn}_2\text{O}_3 + \text{H}_2\text{O}$ ; ox:  $\text{H}_2 \rightarrow 2\text{H}^+ + 2\text{e}^-$ ; red:  $\text{Mn}^{4+} + \text{e}^- \rightarrow \text{Mn}^{3+}$ , j)  $2\text{Ce}^{4+} + 2\text{Cl}^- \rightarrow 2\text{Ce}^{3+} + \text{Cl}_2$ ; ox:  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$ ; red:  $\text{Ce}^{4+} + \text{e}^- \rightarrow \text{Ce}^{3+}$ .