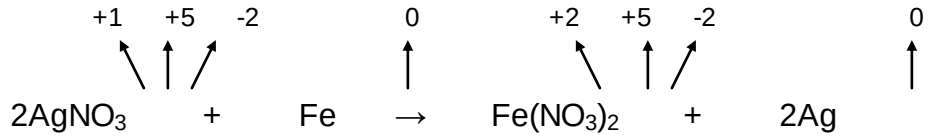
Identifying Redox reactions using Oxidation Numbers

1. Assign an O.N. to each element in the balanced equation

2. Determine which element(s) has had an increase ON (oxidation)

3. Determine which element(s) has had an decrease ON (reduction)

Example 1
Silver Nitrate with an iron nail



The nitrate ion is a spectator

- It does not take part in the reaction.
    - Redox equations **ignore spectator ions**

$$\mathbf{2Ag^{+} + Fe \rightarrow Fe^{2+} + 2Ag}$$

$Ag^{+} \rightarrow$ Ag metal.

- Oxidation number decreased from +1 to 0 = **Reduction**

Fe metal $\rightarrow Fe^{2+}$

- Oxidation number increased from O to +2 = **Oxidation**

Example 2 $H_2 + I_2 \rightarrow 2HI$ Hydrogen oxidised, Iodine reduced
0 0 +1 –1

Example 3 $2Fe + 3Cl_2 \rightarrow 2FeCl_3$ Fe oxidised, chlorine reduced
0 0 +3 –1

Example 4 $NH_3 + HCl \rightarrow NH_4Cl$ Not redox. No ON changed
-3 +1 +1 -1 -3 +1 -1