OXIDATION & REDUCTION

- Oxidation is the addition of O or the removal of H.
- Reduction is the addition of H or the removal of O.
  But avoid using these definitions except in very simple equations such as:
  $CuO + H_2 \rightarrow Cu + H_2O$

Oxidising agents or oxidants

- Are reduced in the process
- Gain electrons
- Decrease in oxidation number

Reducing agents or reductants

- Are oxidised in the process
- Lose electrons
- Increase in oxidation number

- Oxidation is the loss of electrons
- Reduction is the gain of electrons

LEO the lion says "GER"

Balancing Redox Half Equations

1. Work out the formula of the species before and after the change
2. Balance the atoms that are not H or O
3. Balance the O's by adding water molecule(s) to the appropriate side
4. Balance the H's by adding H^+ ion(s) to the appropriate side
5. Balance the charge by adding e^-(s) to the "more positive" side

To combine two Redox Half Equations

1. Write out the two half equations
2. Multiply either/both equations so that the electrons in each balance
3. Add the two equations together and cancel out the electrons
4. Cancel out anything else that appears on both sides of the equation

- Oxidation is an increase in oxidation number
- Reduction is a decrease in oxidation number

The oxidation number is also known as the oxidation state. Write it directly above the element in the format (sign)(number) eg +2 -3

Rules for assigning oxidation numbers/states

1. The oxidation number of an element is zero, 0
2. In molecules the sum of the oxidation numbers adds up to zero
3. In polyatomic ions, the sum of the oxidation numbers adds up to the charge on the ion
4. In simple monatomic ions the oxidation number is the same as the charge on the ion
5. H in compounds is always +1 except in metal hydrides eg NaH where it is -1
6. O in compounds is always -2 except in peroxides eg H_2O_2 where it is -1
7. F in compounds is always -1