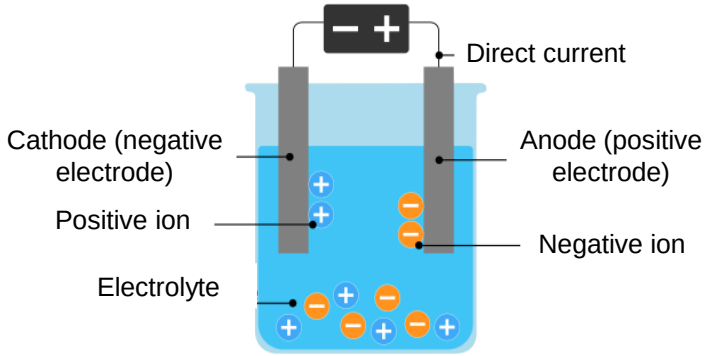
AQA C4b Electrolysis
Combined Foundation
RP – Electrolysis

Extracting Metals Using Electrolysis
Metals can be extracted from molten or dissolved compounds using electrolysis. Aluminium is extracted in this way.
This process is used when the metal is more reactive than carbon.
It is expensive because it needs a lot of electrical energy to produce the current.



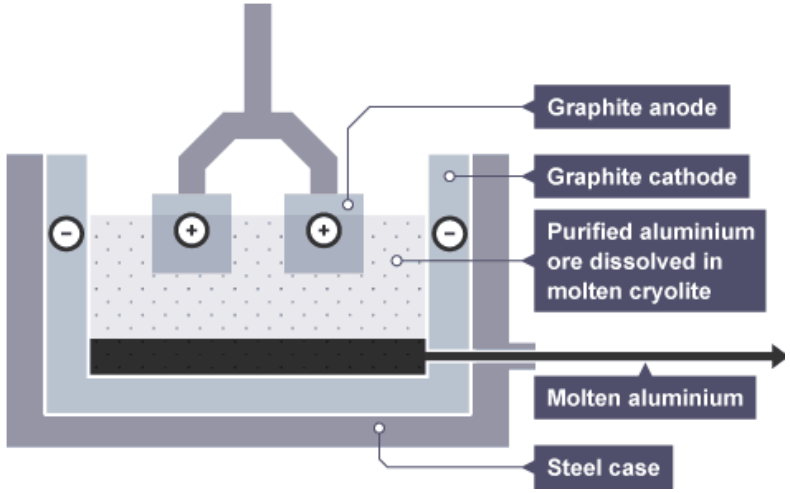
What happens in electrolysis?	When an ionic compound is melted or dissolved in water, the ions become free to move and an electrolyte is made. Passing a current through the electrolyte makes the ions move to the electrodes.
What are the electrodes called?	The positive electrode is the anode The negative electrode is the cathode
Where do the ions go?	Positive ions move to the negative electrode Negative ions move to the positive electrode

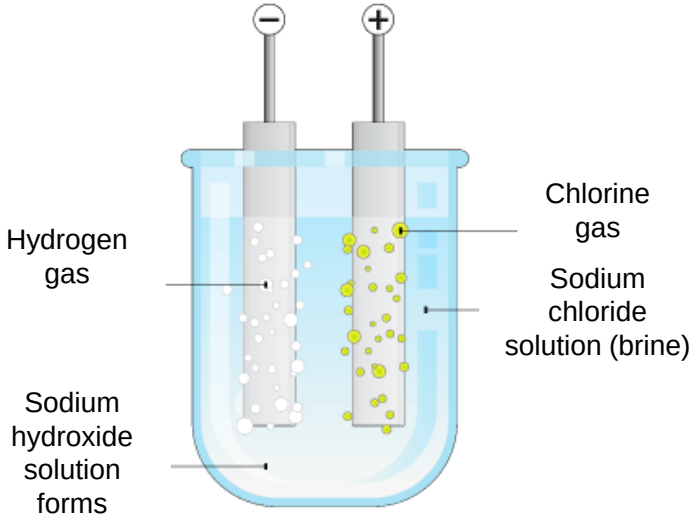
Don't P.A.N.I.C.

Positive Anode,

Negative Is Cathode

Opposite charges attract





Extracting Aluminium
Aluminium oxide is mixed with cryolite to reduce its melting point
aluminium oxide → aluminium + oxygen
$2Al_2O_3$ (l) → 4Al (l) + $3O_2$ (g)
Aluminium forms at the negative electrode (cathode)
Oxygen forms at the positive electrode (anode)
Oxygen reacts with the carbon electrodes to produce carbon dioxide, so the electrode burns away and has to be replaced
C (s) + O_2 (g) → CO_2 (g)

Electrolysis of Solutions	
In water (aqueous solution): H_2O (l) ⇌ H^+ (aq) + ^-OH (aq)	
at the negative electrode	1. The metal will be produced on the electrode if it is less reactive than hydrogen, e.g. copper 2. Hydrogen will be produced if the metal is more reactive than hydrogen., e.g. sodium
at the positive electrode	If you have a halide ion (Cl^-, I^-, Br^-) then you will get chlorine, bromine or iodine formed. Otherwise oxygen is formed at positive electrode from the hydroxide ion.

Electrolysis of Brine
The products are hydrogen, chlorine and sodium hydroxide
Positive anode: **chlorine gas** formed, used to make bleach and plastics
Negative cathode: **hydrogen gas** formed, used to make margarine and hydrochloric acid
In solution: **sodium hydroxide** produced, used to make bleach, paper and soap