- This means magnesium hydroxide is used in medicine as an antacid
- This is because it is alkaline and can neutralise acids

Solubility of sulfates:

- *Group 2 sulfates decrease down the group*
- This means magnesium sulfate is the most soluble and barium sulfate is the least soluble
- The insolubility of barium sulfate means it can be used as barium meals in medicine
- This is a medical tracer that allows internal tissue/organs to be imaged
- Barium sulfate is toxic but is also insoluble and cannot be absorbed into the blood, making it safe to use
- Barium chloride is used a test for sulfate ions
- This is because it reacts to form barium sulfate
- It forms as a white precipitate when there are sulfate ions are present

Metal extraction:

Magnesium is used to extract titanium from titanium chlorine through a displacement reaction.

E.g. $TiCl_4 + 2Mg \rightarrow 2MgCl_2 + Ti$

Flue gas removal:

Calcium oxide reacts with sulfur dioxide to remove it from pollutants as well as prevent it from being released into the atmosphere.
This forms calcium sulfite and water:

$CaO + 2H_2O + SO_2 \rightarrow CaSO_3 + 2H_2O$

Group 7 - The Halogens

The group 7 elements are very reactive non-metals, and need to gain one electron to form a 1- ion and achieve a full outer shell

- *Atomic radius increases down the group,* this is due to additional electron shells
- *Reactivity decreases down the group,* this is because as atomic radius increases, causing the attraction between the electrons and the nucleus to be weakened due to more shielding
- *First ionisation energy decreases as you go down the group,* this is due to a greater atomic radius and increased shielding
- *Boiling point increases down the group,* this is because all group 2 elements are simple covalent molecules with van der waals forces
- *Oxidising power decreases down the group,* their ability to attract electrons decreases due to shielding and a greater atomic radius
- The relative oxidising strengths means that a halogen will displace any halogen beneath it in the periodic table

E.g. Cl_2 will displace Br^- and I^- ions

Testing for ANIONS