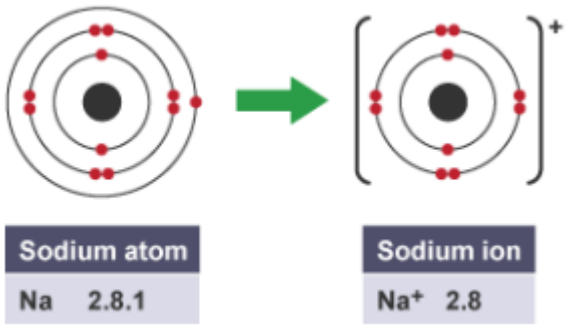
Ionic Bonding Summary

Forming positive ions

Metal atoms lose electrons from their outer shell when they form ions:

- the ions are positive, because they have more **protons** than electrons
- the ions formed have full outer shells
- the ions have the electronic structure of a noble gas (group 0 element), with a full outer shell

For elements in **groups** 1, 2 and 3, the number of electrons lost is the same as the group number.

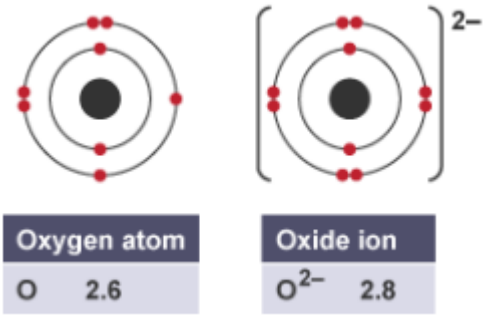


Forming negative ions

The outer shells of non-metal atoms gain electrons when they form ions:

- the ions formed are negative, because they have more electrons than protons
- the ions have the electronic structure of a noble gas (group 0 element), with a full outer shell

For elements in groups 6 and 7, the charge on the ion is equal to (8 minus group number).

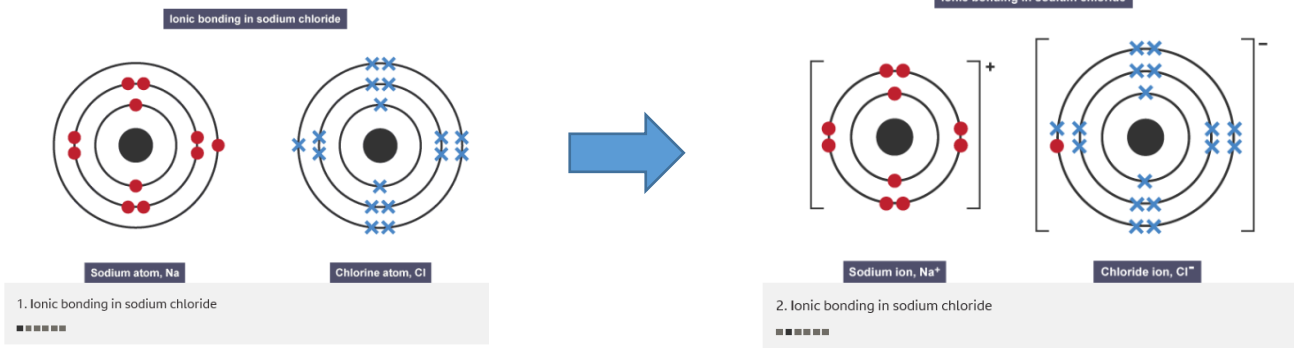


Positive and negative ions form when a metal reacts with a non-metal, by transferring electrons.
The oppositely charged ions are strongly attracted to each other, forming **Ionic Bonds**

Dot and cross diagrams

Modelling ionic bonding

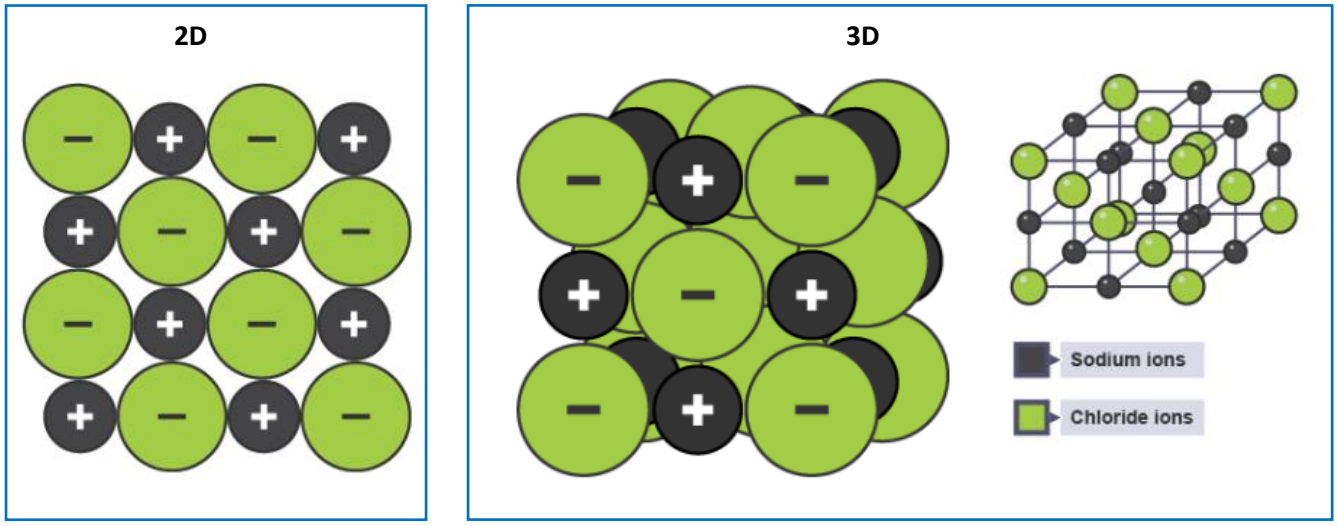
The slideshow shows dot and cross diagrams for the ions in sodium chloride, magnesium oxide and calcium chloride.



The Ionic Lattice

An ionic compound is a giant structure of ions – regular repeating arrangement called an **Ionic lattice**

It is held together by strong **electrostatic forces** of attraction between the oppositely charged ions in all directions and this is **Ionic Bonding**



Properties of Ionic Compounds	
Regular structures called giant	Giant Ionic Lattice, strong electrostatic forces of attraction between oppositely charged ions
High Melting and Boiling points	Solid state at room temperature – requires a lot of energy to overcome the electrostatic forces
Strength of ionic bonds depends on charge on the ions	Higher the charge, the stronger the forces Compound: NaCl, Melting point: 801°C, Boiling point: 1,413°C Compound: MgO, Melting point: 2,852°C, Boiling point: 3,600°C
Conduct electricity	Contains charged partices (ions) and free to move in molten/liquid/aqueous state (but not solid state)