Summary Sheets – 2: KS4 – Ionic compounds

Formation of ions

Atoms of metallic elements in Groups 1,2 and 3 can form positive ions when they take part in reactions since they are readily able to lose electrons.

Atoms of Group 1 metals lose one electron and form ions with a 1+ charge, e.g. Na+

Atoms of Group 2 metals lose two electrons and form ions with a 2+ charge, e.g. Mg2+

Atoms of Group 3 metals lose three electrons and form ions with a 3+ charge, e.g. Al3+

Atoms of non-metallic elements in Groups 5, 6 and 7 can form negative ions when they take part in reactions since they are able to gain electrons.

Atoms of Group 5 non-metals gain three electrons and form ions with a 3– charge, e.g. N3–

Atoms of Group 6 non-metals gain two electrons and form ions with a 2– charge, e.g. O2–

Atoms of Group 7 non-metals gain one electrons and form ions with a 1– charge, e.g. Cl–

![C:\Users\Samia.ElAli\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\images[2].jpg]()

ANions = Negative Ca+ions = +ive

Why are ions negative or positive?

* Find the atomic number (the smaller number with the symbol).
* This equals the number of protons, which equals the number of electrons in an uncharged/neutral atom.
* If electrons are lost from the atom, there are now more protons than electrons, so the ion is positively charged.
* If electrons are gained by the atom, there are now fewer protons than electrons, so the ion is negatively charged.

KS4 – Dot-and-cross diagrams for ionic bonding

Hints and tips

Always …

… count the electrons!

… remember that ions should have full outer shells.

… make sure that when an ion is formed, you put square brackets round the diagram and show the charge.

Never …

… show the electron shells overlapping.

… show electrons being shared (ions are formed by the **transfer** of electrons!).

… remove electrons from the inner shell.

… give metals a negative charge.





KS4 – Covalent compounds (simple covalent bonding)

Distinguish between:

‘How a covalent bond is formed’: A covalent bond is formed when a pair of electrons is shared between two atoms.

‘What is a covalent bond?’: Electrostatic attraction between a shared pair of electrons and the nuclei of the atoms.

Covalent bonding results in the formation of molecules.

Hints and tips

Always …

… show the shells touching or overlapping where the covalent bond is formed.

… count the final number of electrons around each atom to make sure that the outer shell is full.

Never …

… include a charge on the atoms.

… draw the electron shells separated.

… draw unpaired electrons in the region of overlap.

The two diagrams below only show the outer-shell electrons.

