

## Year 9 Springboard - C3: Bonding

### Lessons 1 - 2 Ionic Bonding

**Keywords:**

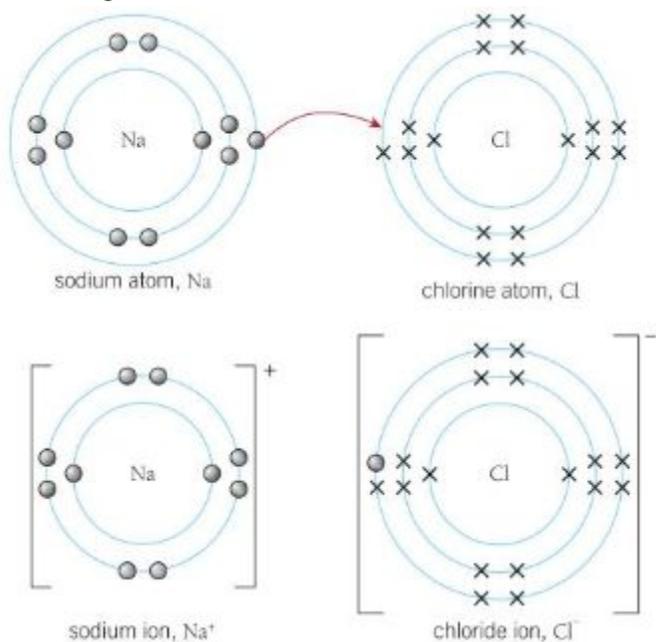
**Ion:** Charged Particle (electrons gained = metals, lost = non-metals)

**Ionic Bond:** Strong electrostatic force between oppositely charged ions

**Giant Ionic Lattice:** A structure of ionic compounds where the ions are arranged in a repeating pattern held by the attraction between opposite charges.

**Minimum Knowledge**

Ions are formed when electrons are gained or lost. Oppositely charged ions are attracted to each other forming an ionic bond. Bonds are drawn using **dot-and-cross diagrams** (see diagram). Square Brackets  $[\ ]$  are used to show the charged ions.



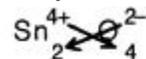
### Lessons 3 - 4 Ionic Formulas

**Keywords:**

**Compound (polyatomic) ion:** An ion formed of more than one element, the ion has an overall charge.

**Minimum Knowledge**

**Ionic compounds** always have an overall charge of 0 meaning that the positive and negative charges must cancel each other out. Sometimes more than one atom is needed, for exam  $MgCl_2$  two Chlorine atoms with a charge of -1 are used to cancel out the charge of +2 on magnesium. You can use the criss-cross method to find the number needed in a compound. Don't forget to always use the simplest ratio.



**Polyatomic Ions** are balanced as a group. As the charge applies to the whole group.

$Mg^{2+}$  and  $SO_4^{2-}$  would have the formula  $MgSO_4$  as the 2+ and 2- cancel out.

Ion	Charge
Ammonium ( $NH_3^+$ )	+1
Hydroxide ( $OH^-$ )	-1
Nitrate ( $NO_3^{2-}$ )	-1
Carbonate ( $CO_3^{2-}$ )	-2
Sulfate ( $SO_4^{2-}$ )	-2

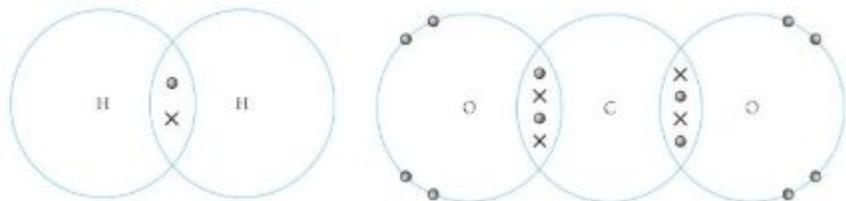
### Lesson 5 - 6 Covalent Bonding

#### Keywords:

**Covalent Bond:** A bond formed by a shared pair of electrons between two non-metal elements.

#### Minimum Knowledge

You can draw the bond using a dot and cross diagram, where the shared pair of electrons are shown in between (similar to a venn diagram)



You can also show the bonds using a straight line in the displayed formula.



### Lesson 7- 8 Chemical Equations

#### Keywords:

**Balanced Equation:** More detailed than a word equation this show how the atoms are arranged before and after the chemical reaction happens.

#### Minimum Knowledge

The number of atoms of each element has to be equal before and after the reaction.

State symbols are used to indicate the state of each molecule. They are always subscripts.

S = Solid      aq = Aqueous solution

L = Liquid      g = gas

### Lesson 8 - 9 Conservation of mass

#### Keywords:

**Law of conservation of mass:** All the mass at the start of the reaction has to be present at the end of the reaction in a **closed system**.

**Closed System:** A system where compounds can't escape during the reaction.

**Precipitate:** A compound in a different state formed during a reaction - example a solid that forms when two liquids are mixed.