Revision Sheet #2 | Lower Secondary Stage (6-8)

1st Semester | 2023-2024

Name: Answer Key

Subject: Science/ Chemistry **Chapter:** Ions, Ionic Compounds and Ionic Bonds

Objectives:

- Define atoms and ions.
- Draw atomic configuration of different atoms and ions.
- Name different ionic compounds.
- Draw dot and cross diagrams.

1 – IONS

An ion is an atom that has gained one or more electrons to be negatively charged, or lost one or more electrons to be positively charged.

Atoms form ions to gain a stable electron configuration.
The chemical formulae of an ion shows the chemical symbol of the element and the charge of the ion.

Positive ions (Cations) and Negative ions (Anions):

	Positive ions	**Negative ions**
Net charge	Positive (+)	Negative (-)
Formation	Formed when the atom loses electrons	Formed when the atom gains electrons
Element type	Metals	Non-metals

Let's practise!

- How can you tell how many electrons an element has in its outer shell?

Using the periodic table, find the group number of the element.

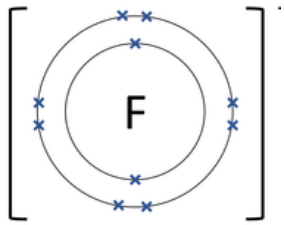
- What happens to the electrons in the outermost shell when ionic bonds are formed?

Electrons are transferred between atoms (lost or gained)

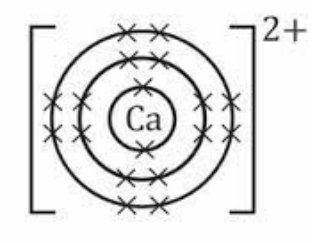
- Complete the following table.

Element's symbol	Atomic configuration	No. of electrons in the atom	No. of protons in the atom	No. of electrons in the ion	No. of protons in the ion	No. of electrons lost or gained	Charge of ion	Name of ion
Na	**2,8,1**	**11**	**11**	**10**	**11**	**1**	**1+**	**sodium ion**
Cl	**2,8,7**	**17**	**17**	**18**	**17**	**1**	**1-**	**chloride ion**
O	**2,6**	**8**	**8**	**10**	**8**	**2**	**2-**	**oxide ion**
Al	**2,8,3**	**13**	**13**	**10**	**13**	**3**	**3+**	**aluminum ion**

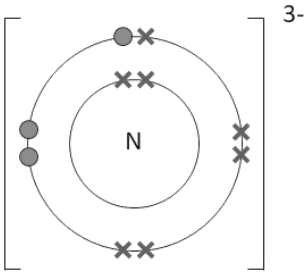
- Draw the atomic configuration of the following.



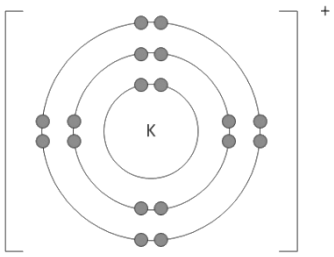
Flouride ion



Calcium ion



Nitride ion



Potassium ion

2 – Ionic compounds

Ionic compounds are made of positive and negative ions.
When elements (a metal and a non-metal) combine with each other, they form an ionic bond.
How to write the chemical formulae of an ionic compound:

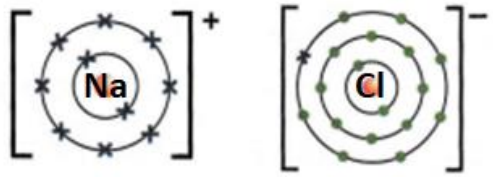
- Write the symbol and charge of the positive ion (metal) first and then the negative ion (non-metal).
- Transfer the number of the positive charge to become the susbscript of the non-metal and the number of the negative charge to become thr subscript of the metal.

Example: Ca^{2+} O^{2-} → CaO

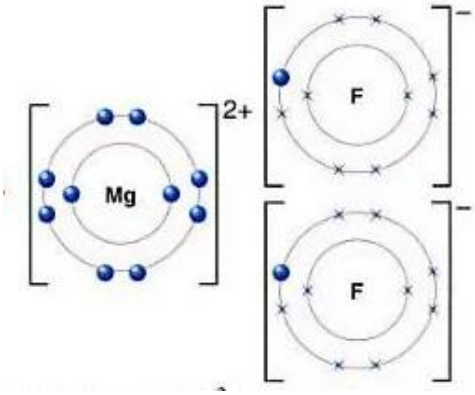
Al^{3+} Cl^{1-} → $AlCl_3$

Let's practise!

- Draw a diagram to represent the bonding between a sodium atom and a chlorine atom.



- Draw a diagram to represent the bonding between a magnesium atom and a fluorine atom.



- Complete the following table with the missing information.

Reactants	Chemical formulae	Name of ionic compound
Ca + Br	Ca^{2+} Br^{1-} → $CaBr_2$	Calcium bromide
Mg + O	Mg^{2+} O^{2-} → MgO	Magnesium oxide
Li + F	Li^{1+} F^{1-} → LiF	Lithium fluoride

- Fill in the missing information in the table below.

Positive ion	Formulae of positive ion	Negative ion	Formulae of negative ion	Formulae of the compound
Magnesium ion	**Mg^{2+}**	**Chloride ion**	**Cl^{1-}**	$MgCl_2$
Potassium ion	**K^{1+}**	**Bromide ion**	Br^{1-}	**KBr**
Calcium ion	**Ca^{2+}**	**Oxide ion**	**O^{2-}**	CaO
Lithium ion	**Li^{1+}**	Fluoride ion	**F^{1-}**	**LiF**