Integrated Science
Level: Form 3

Topic: Chemical Bonding

Learning Outcome: 3.7.1 Describe how atoms combine to form molecules

Key points

- Atoms bond/combine in order to achieve a stable outermost electronic configuration OR a full outer shell.
- In order to obtain this full outer shell, an atom can either:

- Gain electrons
- Lose electrons
- Share electrons

Key points

Ionic Bonding

- This occurs when atoms gain or lose electrons to attain full outer shells.
- Takes place between a METAL and a NON-METAL.

Key points

Covalent Bonding

- This occurs when atoms share electrons to attain full outer shells.
- Takes place between two NON-METALS.

Key points

Both ionic or electrovalent bonding and covalent bonding are illustrated using Dot and Cross diagrams.

The video below illustrates ionic bonding in the following:

- sodium chloride
- magnesium oxide
- calcium chloride.

https://youtu.be/zpaHPXVR8WU

Key points

The video below illustrates covalent bonding in the following molecules:

- Hydrogen
- Oxygen
- Nitrogen

https://youtu.be/0HfN3CvXP2M

Assessment 1

The table on the next slide contains four (4) statements related to either ionic or covalent bonding

Please complete the table on the next slide by placing an X in the appropriate box.

Table comparing ionic and covalent bonding

Statement	Covalent bonding	Ionic bonding
Takes place between a metal and a non-metal		
Takes place between non-metals		
Occurs by the transfer of electron(s)		
Occurs by the sharing		

Answer – Assessment 1

Statement	Covalent bonding	Ionic bonding
Takes place between a metal and a non-metal		X
Takes place between non-metals	X	
Occurs by the transfer of electron(s)		X
Occurs by the sharing of electrons	X	

Assessment 2

Using dot and cross diagrams, illustrate bonding in:

- Potassium chloride
- Water

Answer Assessment 2

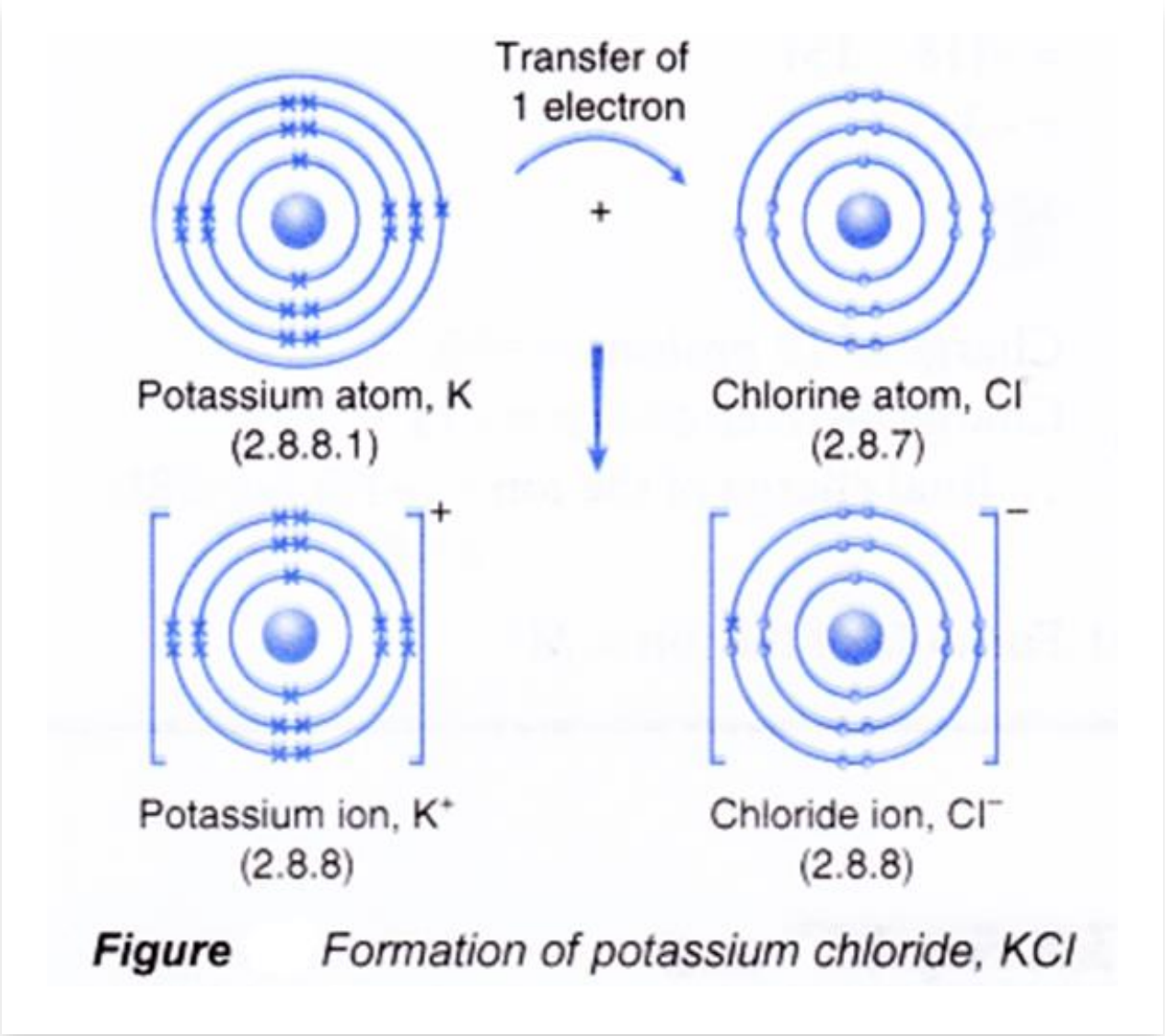

Figure *Formation of potassium chloride, KCl*

Answer Assessment 2

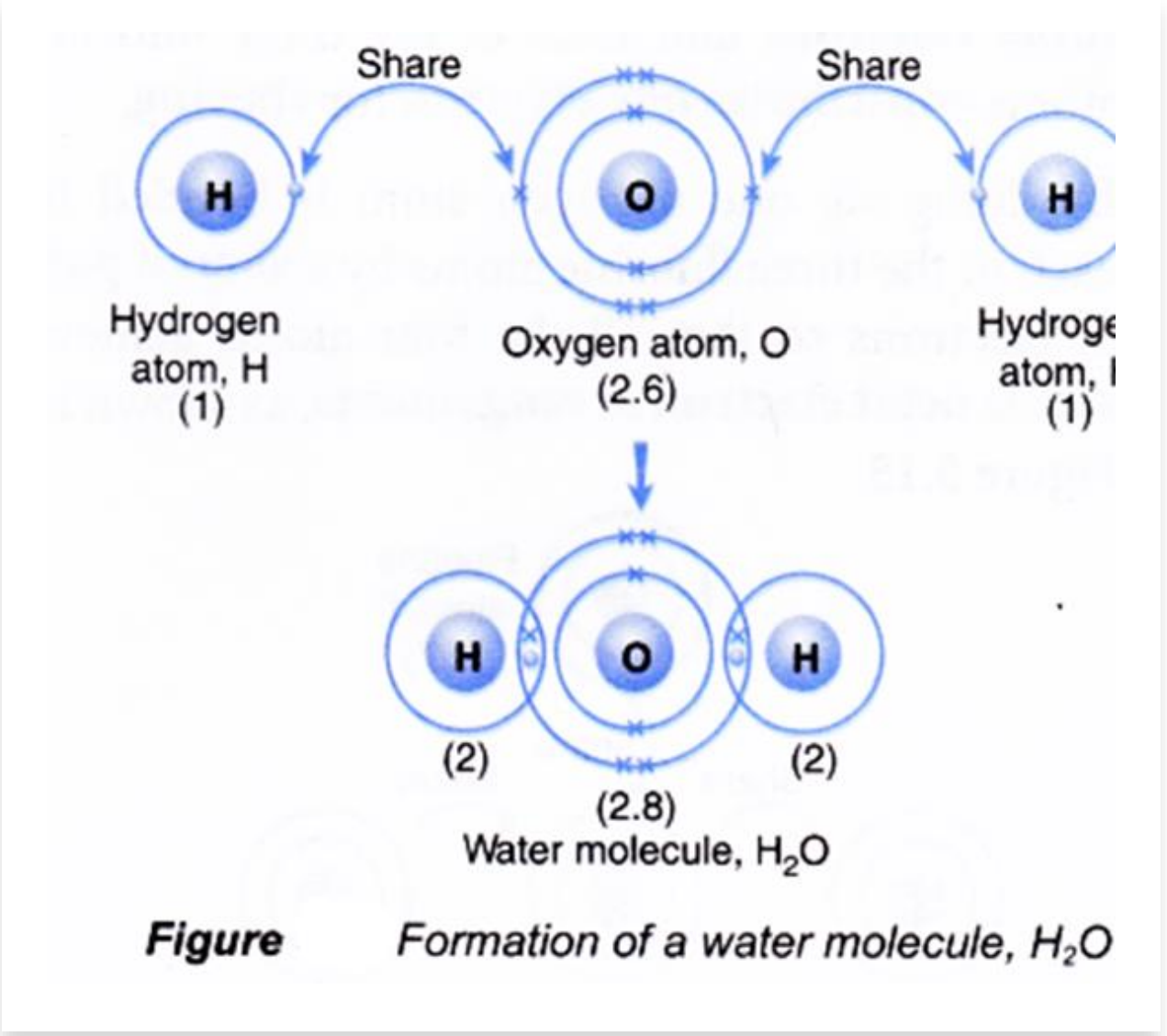

Figure *Formation of a water molecule, H_2O*

Further Activities at home

You can practice drawing dot and cross diagrams for the following:

Aluminium oxide

Sulphur dioxide

References

Ionic bonding in potassium chloride

https://www.aplustopper.com/explain-formation-ionic-bonds-examples/

Covalent bonding in water

https://www.pinterest.com/pin/711498441110839870/