

***Al-Mustaqbal University College***

***Department of Medical Physics***

***First Class***

***General Chemistry***

***Lec 3 Chemical Bond***

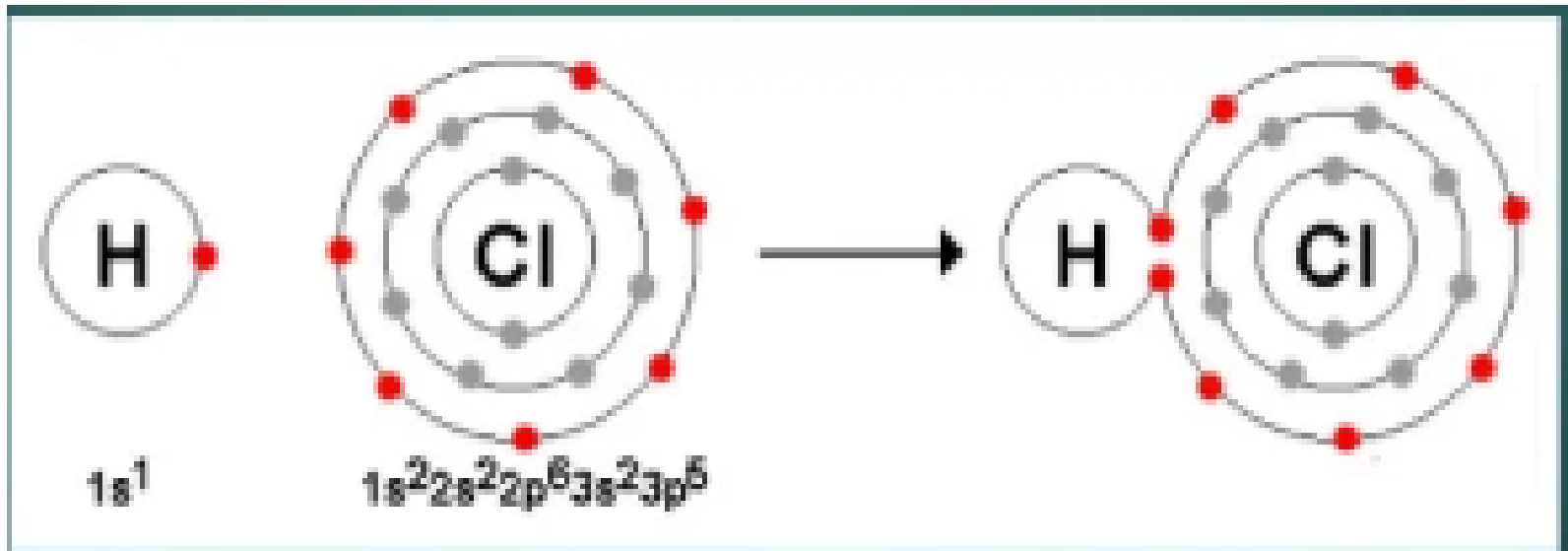
***M.S.C.Doa.Nassr***

# Chemical Bond

Attraction between atoms that form new chemical compound

Filling the Valence shell

Trying to achieve a stable octet



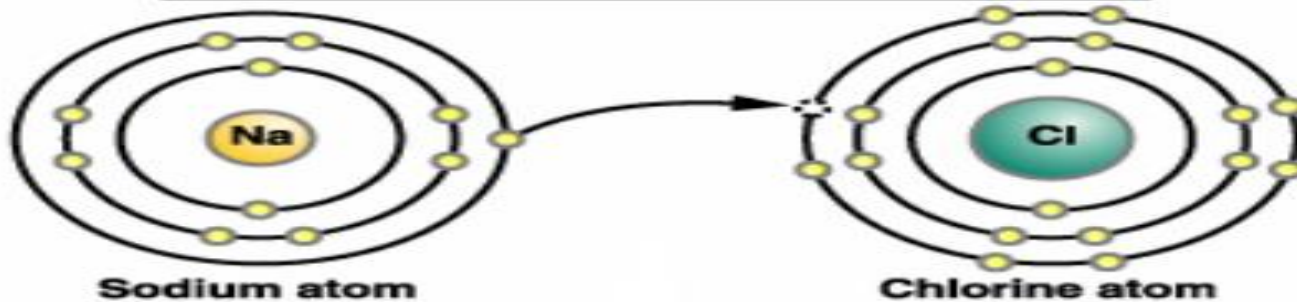
## *octet Rule*

- The octet rule is a simple rule is a simple chemical rule of thumb
- Octet Rule says atoms with 8 electron in their outer shell
- Atoms tend to combine in such a way that they each have eight valence shells ,giving them the same electron configuration as a noble gas

# *Ionic Bond*

- Formed between metal and non metal
  - Metal loses electron to form cation
  - Non-metal gains electron to form anion
  - Ionic bonds is a type of chemical bond based on electrostatic forces between two oppositely –charged ions
- It is basically the transfer of one electron from one atom to another

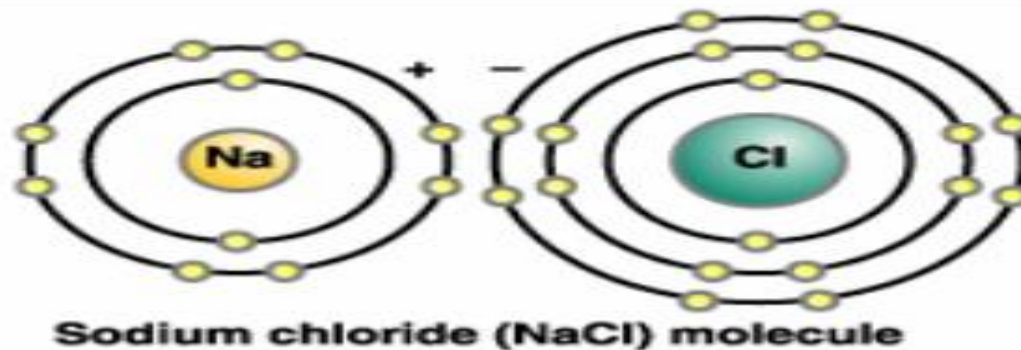
**Step 1: Sodium gives up its one weakly held electron to chlorine**



**Step 2: The sodium and chloride ions both have stable outer shells that are filled with electrons**



**Step 3: The  $\text{Na}^+$  and  $\text{Cl}^-$  ions are attracted to each other because of their opposite charges.**



For example, common table salt is sodium chloride. When sodium (Na) and chlorine (Cl) are combined, the sodium atoms each lose an electron, forming cations ( $\text{Na}^+$ ), and the chlorine atoms each gain an electron to form anions ( $\text{Cl}^-$ ). These ions are then attracted to each other in a 1:1 ratio to form sodium chloride ( $\text{NaCl}$ ).

### *Properties of ionic bond*

1-Ionic compounds form when atoms connect to one another by ionic bonds.

2-An ionic bond is the strongest type of chemical bond, which leads to characteristic properties

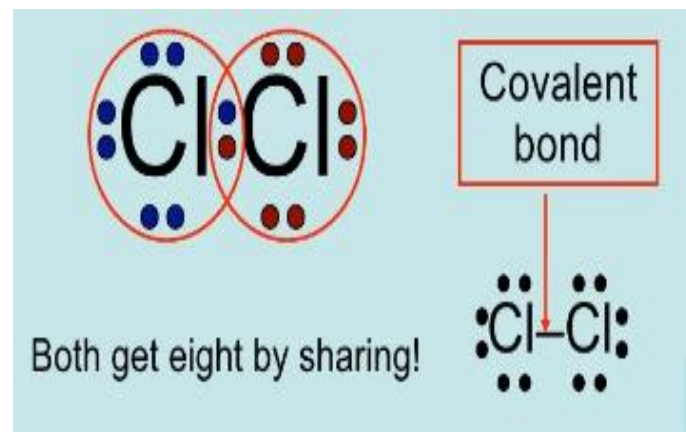
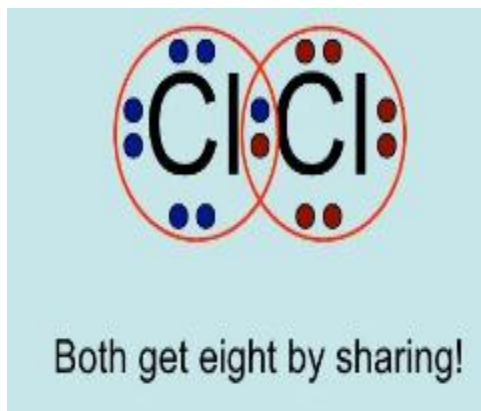
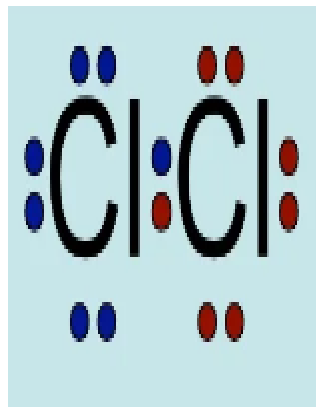
3-One atom in the bond has a partial positive charge, while the other atom has a partial negative charge. This electronegativity difference makes the bond polar, so some compounds are polar.

4-But, polar compounds often dissolve in water. This makes ionic compounds good electrolytes.

5-Due to the strength of the ionic bond, ionic compounds have high melting and boiling points and high enthalpies of fusion and vaporization.

# Covalent Bond

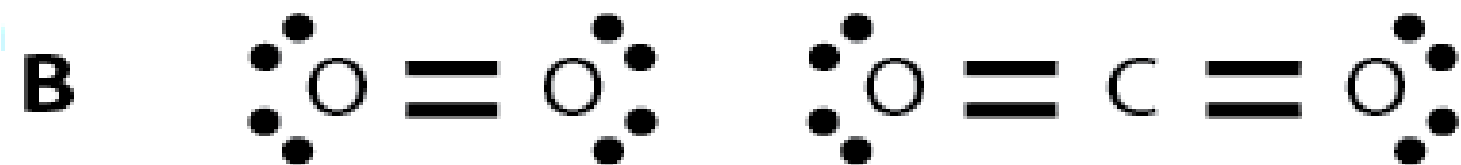
- Sharing of electron
- Covalent bonds occur between two non- metals
- Non-metals need to gain electrons in order to eight=(The OCTET RULE)





## Three types of Covalent Bonds...

- **Single Bond:** A single covalent bond is formed when two atoms bond and share a single pair of electron.
- **Double Bonds:** A type of covalent bond in which two electron pairs are shared between two atoms. Each atom contributes two electrons to the bond.
- **Triple Bonds:** A covalent bond in which three electron pairs are shared between two atoms.



A:Single Bond

B:Double Bond

C:Triple Bond

## *Properties of ionic and covalent compounds*

<b>Property</b>	<b>Ionic</b>	<b>Covalent</b>
<i>How bond is made</i>	Transfer of $e^-$	Sharing of $e^-$
<i>Bond is between</i>	Metals and nonmetals	Nonmetals
<i>Position on periodic table</i>	Opposite sides	Close together
<i>Dissolve in water?</i>	Yes	Varies
<i>Consistency</i>	Brittle	Soft
<i>Melting temperature</i>	High	Low

*Thank  
you*

