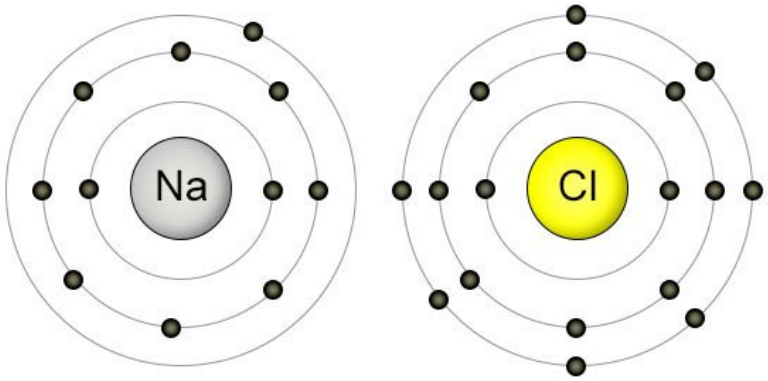
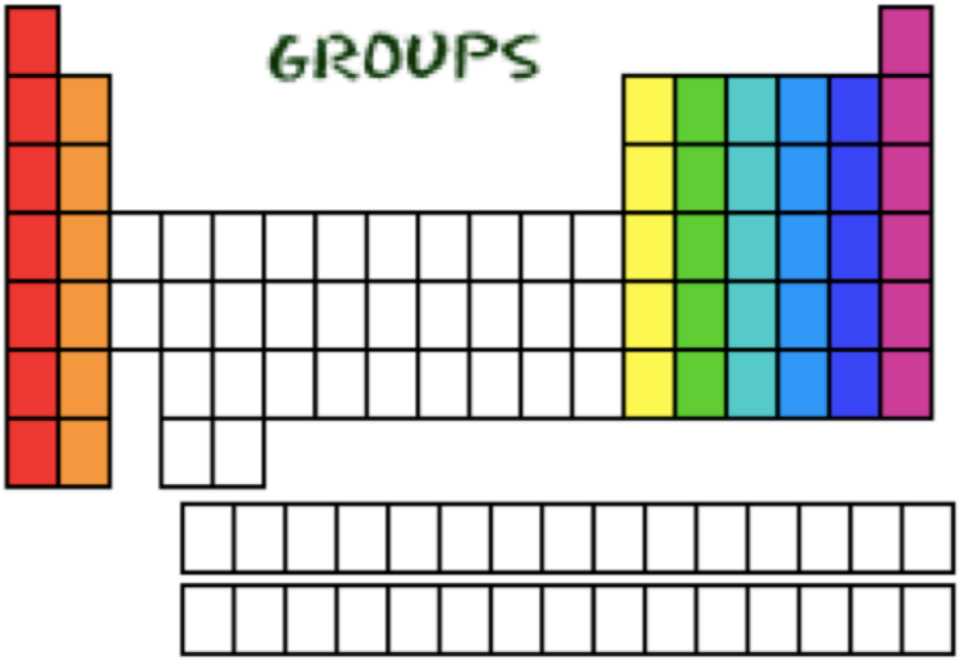
# **Molecular** Compounds (Lewis Dot Diagrams)

## Valence Electrons

- Valence electrons are the electrons in the highest occupied energy level of the atom.

- Valence electrons are the only electrons generally involved in bond formation.



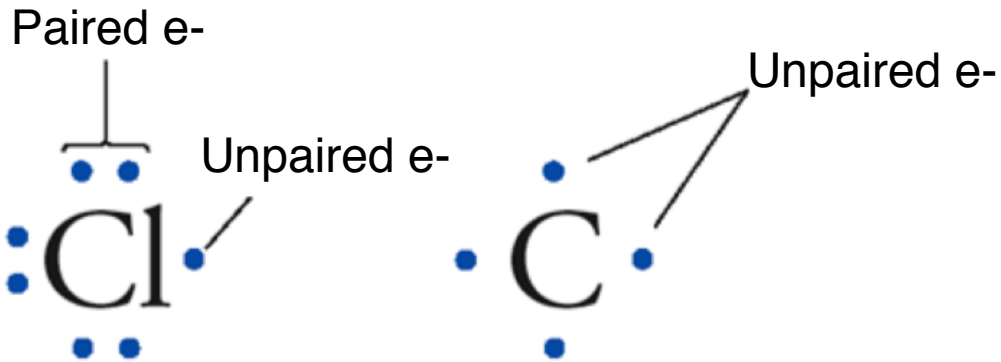



- Each element in a group has the same number of electrons in their outer energy level (the valence level).
- The electrons in the outer shell are called “valence electrons”

## Electron Dot Structure or Lewis Dot Diagram

(Gilbert Lewis)

A notation showing the valence electrons surrounding the atomic symbol.



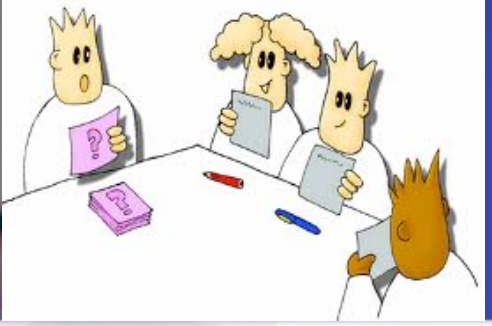
## Making Lewis Dot Example with Carbon

1) Write the element symbol.

C

2) Carbon is in the $4^{th}$ group, so it has 4 valence electrons.

3) Starting at the right, draw 4 electrons, or dots, around the element symbol



A Lewis dot diagram for the following.

Cl

O

H

Ne

Si

P

Ca

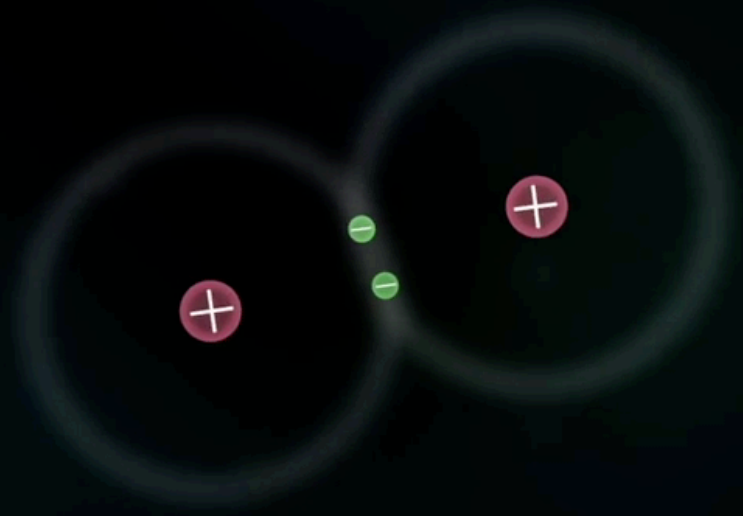
He

**Ionic compounds** are made of;

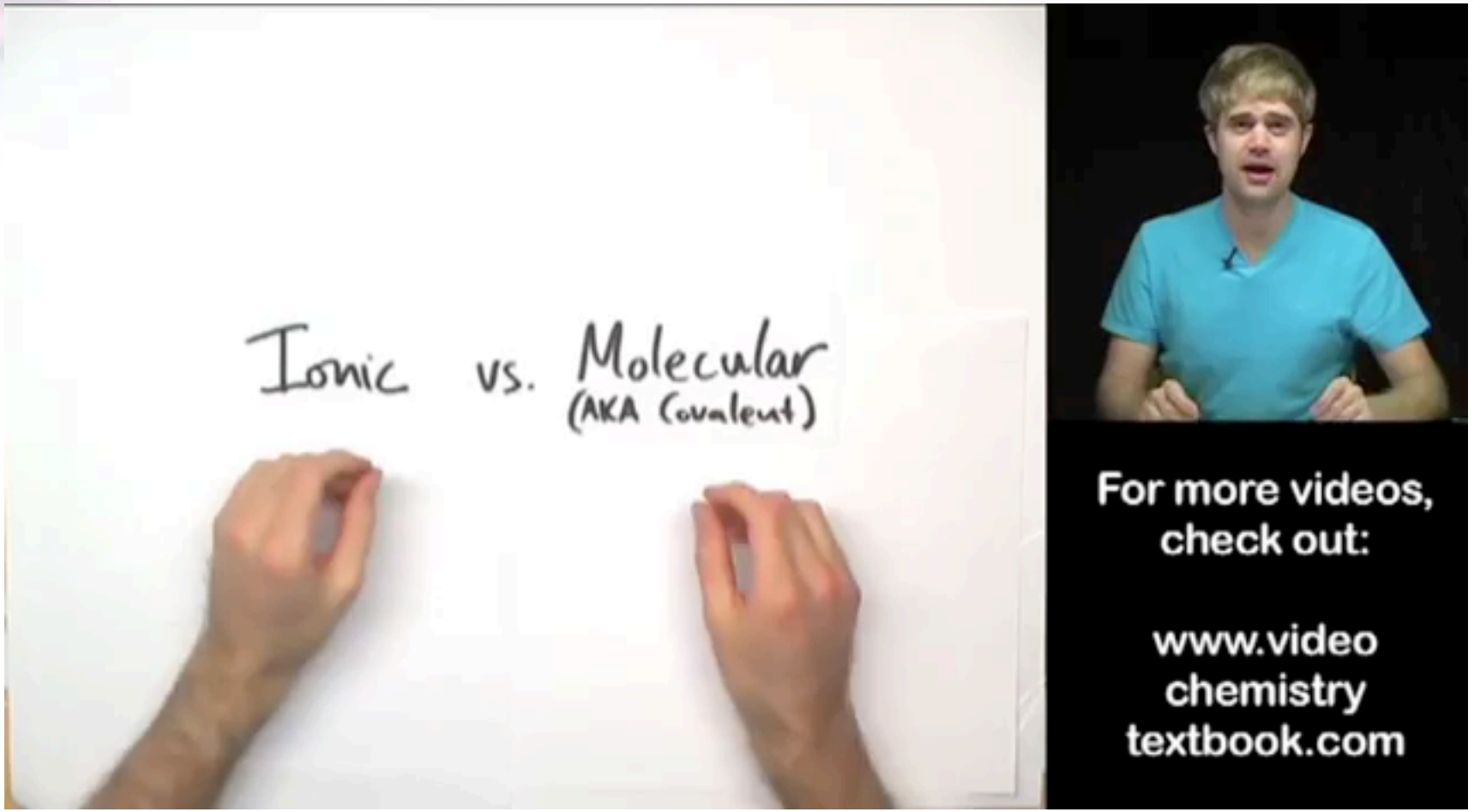
One Cation and one Anion, which can be..

What is the difference between **ionic** compounds and **molecular** compounds?

$H_2$



What is the difference between **ionic** compounds and **molecular** compounds?


Ionic vs. Molecular
(AKA Covalent)
For more videos,
check out:
www.video
chemistry
textbook.com

# Molecular Molecules

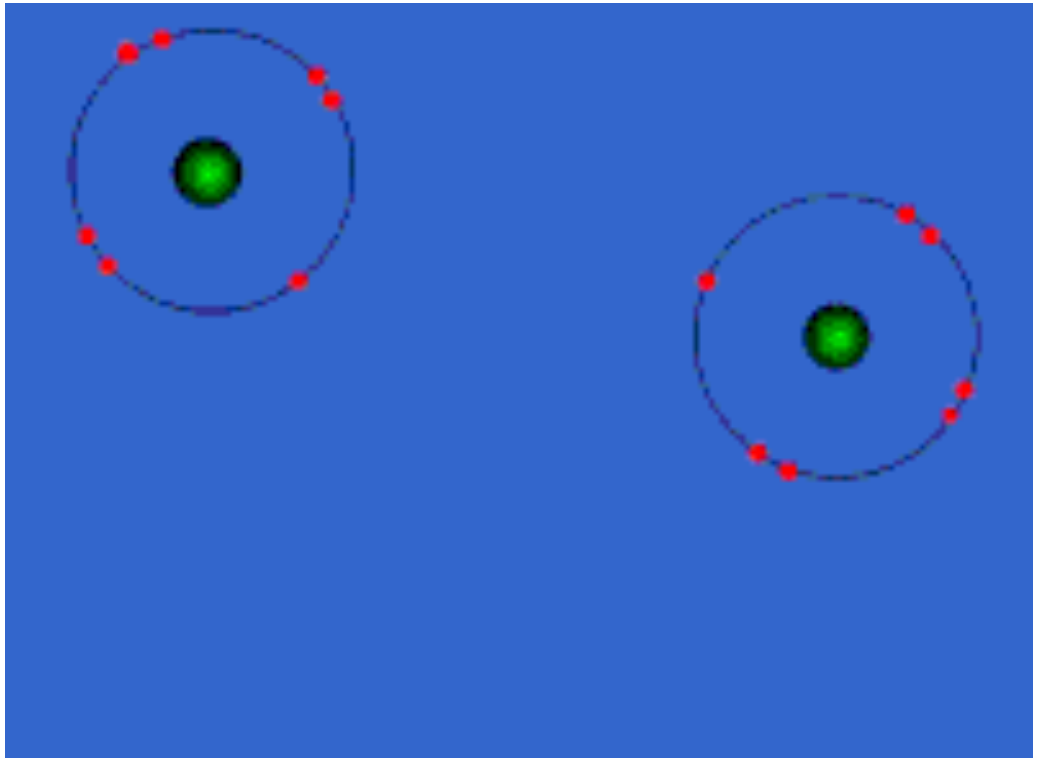
- Most compounds that you find everyday are **molecular** compounds
  - *e.g.* ***Sugar, gases we breathe, liquids we consume, and many of the substance we use everyday***

# Molecular Molecules

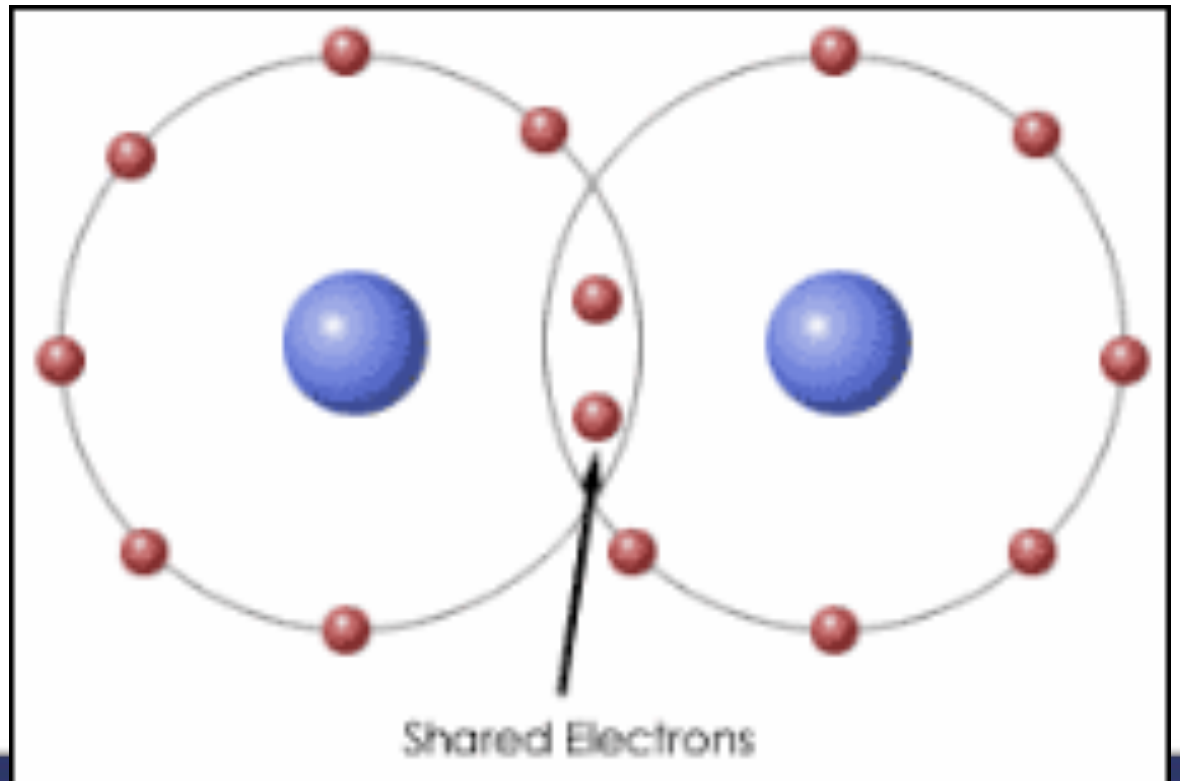
NOT ionic means, molecular compounds are:

- usually not crystals
- low melting point
- less soluble in water
- non-conductive
- malleable in many cases

- Molecular compounds are NOT made of ions.
- They do not lose or gain electrons, **they share electrons**. **(= Covalent Bond)**



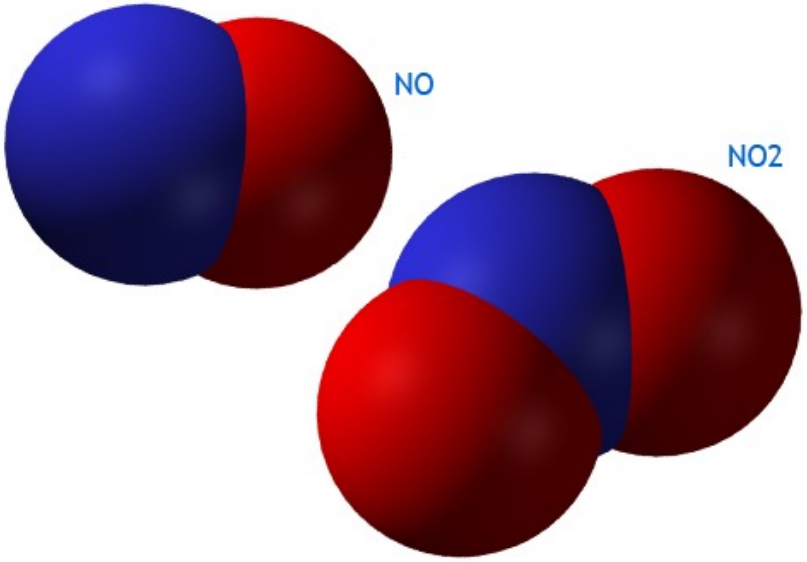
- Molecular Compounds are made of **ONLY Non-metals**

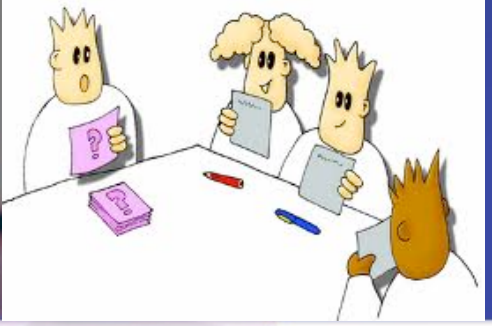


• There are **thousands** more molecular compounds than ionic.

e.g. nitrogen and oxygen can form different molecules

**NO**, **$NO_2$**, **$N_2O_2$**





Which of the following are IONIC? MOLECULAR?

$AlCl_3$

$N_2O_3$

$Fe_2O_3$

$CH_4$

$Si_2O_8$

$P_2O_6$

$Ca(IO_2)_2$

$CCl_4$

$(NH_4)_3P$

## Naming molecular compounds

- **Prefixes** are used to count the number of atoms in the **molecule**.

$CO$ = carbon **mono**xide

$CO_2$ = carbon **di**oxide

$NO_3$ = nitrogen **tri**oxide

$N_2O_4$ = **di**nitrogen **tetr**oxide

$P_2O_5$ = **di**phosphorus **pent**oxide

| **# of atoms** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Prefix** | Mono | Di | Tri | Tetra | Penta | Hexa | Hepta | Octa | Nona | Deca |

# Naming Binary Molecular Compounds: IUPAC

1. *Write down the name of the name of the* ***first element***.

2.***If*** *there is more than* ***one*** *atom of this element, then attach a Greek* ***prefix****.*

*3. Attach (****ALWAYS****) a Greek prefix (relating to the number of atoms) to the* ***second*** *elements name and add the ending* ***-ide.***

Example:

CO = **Carbon monoxide**

$CO_2$ = **Carbon dioxide**