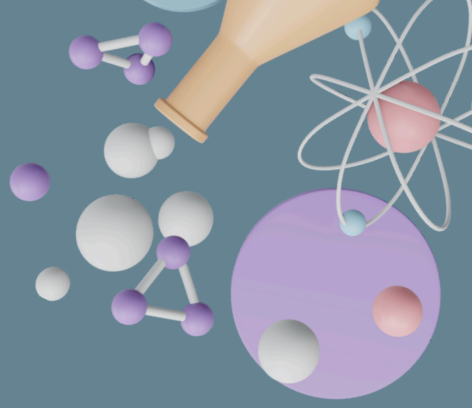
🧪🔗 MINI-MODULE 2: CHEMICAL BONDING & PROPERTIES OF COMPOUNDS



🎯 Learning Goals

By the end of this module, I should be able to:

✅ Identify the type of bond in a compound (ionic or covalent)

✅ Explain how atoms bond and form molecules

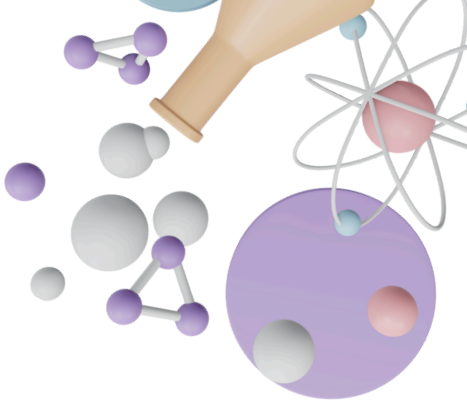
✅ Describe the different properties of ionic and covalent compounds

✅ Compare how each compound behaves in real life

📚 Read & Learn: How Do Atoms Stick Together?

Atoms combine to form compounds, and the way they bond makes all the difference! There are 2 main types of bonds:

Bond Type	Formed Between	Electrons Are...	Example
Ionic	Metal + Nonmetal	Transferred from metal to nonmetal	Sodium chloride ($NaCl$) 🧂
Covalent	Nonmetal + Nonmetal	Shared between atoms	Water (H_2O) 💧



🧠 Identify Them!

NaCl = Ionic (Na = metal, Cl = nonmetal)
CO_2 = Covalent (both nonmetals)
$C_6H_{12}O_6$ (sugar) = Covalent
MgO = Ionic
HCl = Covalent

🪑 Comparing Properties: Ionic vs. Covalent

Property	Ionic	Covalent
🔬 State at Room Temp	Solid	Solid, liquid, or gas
🔥 Melting/Boiling Point	High	Low
💎 Texture	Hard & brittle	Soft & flexible
⚡ Conductivity	Yes (in solution)	No
💧 Solubility	Soluble in water	May or may not dissolve
🔥 Flammability	Less flammable	More flammable
🔌 Electricity	Good conductor	Poor conductor

🧠 Real-Life Check: Salt or Sugar?

Mara's Dilemma: She's confused which canister has salt (NaCl) and which has sugar ($C_6H_{12}O_6$).

❓ How can she tell the difference without tasting?

Answer:

✅ Salt (ionic) will conduct electricity in water.

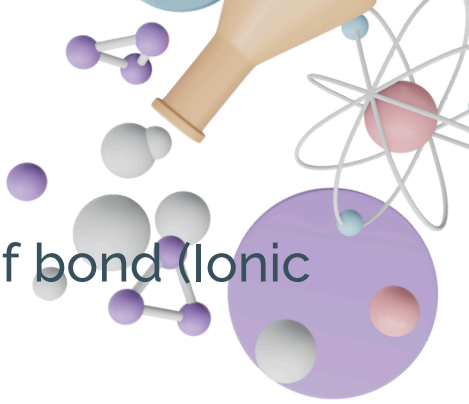
❌ Sugar (covalent) will not conduct electricity even when dissolved.

🎲 Activity Time!

1. Name That Bond!

Classify these compounds as ionic or covalent:

1. H_2O
2. NaCl
3. CO_2
4. $CaCl_2$
5. CH_4
6. KBr
7. NH_3
8. MgO
9. O_2
10. HCl



2. Bond Detective – Property Match

Match the property to the correct type of bond (Ionic or Covalent):

A. Usually gas or liquid

B. Conducts electricity in water

C. Hard and brittle

D. Low melting point

E. High boiling point

F. Flammable

G. Poor conductor of heat

3. EN Difference = Bond Type!

Use this guide:

- EN diff > 1.9 → Ionic
- 0.5 < EN diff < 1.9 → Polar Covalent
- EN diff < 0.5 → Nonpolar Covalent

Calculate and classify:

1. Na (0.9) + Cl (3.0) →
2. H (2.1) + O (3.5) →
3. Cl (3.0) + Cl (3.0) →

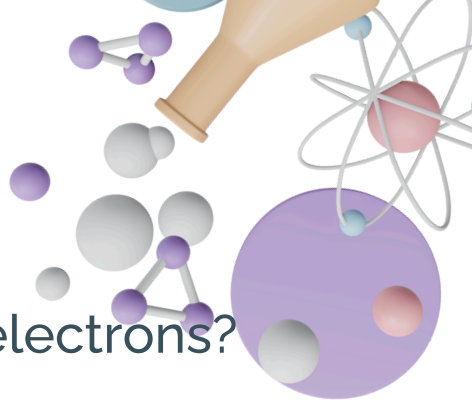
🧠 Self-Check

□ I can tell if a compound is ionic or covalent

□ I understand the physical properties of each type

□ I can explain why salt conducts electricity but sugar doesn't

□ I can use electronegativity to classify bonds



🧠 Mini-Quiz

1.What type of bond involves sharing electrons?
A. Ionic
B. Covalent ✅
C. Metallic
D. Nuclear
2. Which of these compounds is ionic?
A. H_2O
B. CO_2
C. NaCl ✅
D. CH_4
3. Why do ionic compounds have high melting points?
A. Weak attraction
B. Strong ion lattice ✅
C. Mobile electrons
D. Shared charges
4. Which of the following conducts electricity in water?
A. Sugar
B. Oil
C. Alcohol
D. Saltwater ✅