

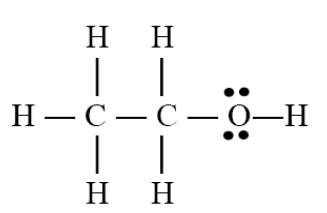
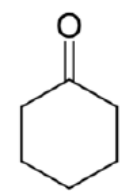
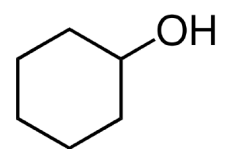
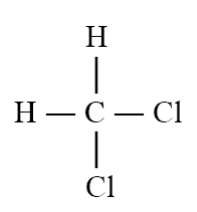
Intermolecular Forces Summary, Worksheet, and Key

Summary of Non-Covalent Interactions:

Attractive Force	Interaction Between:
Hydrogen Bonding (intermolecular)	
Dipole-Dipole (intermolecular)	
London Forces (intermolecular)	
Ion-Dipole	
Salt Bridge	

Problems:

1) Name the dominant (strongest) intermolecular force in the following pairs:

Compound	Dominant Force (Strongest Possible Force)
Methane and Methane (CH ₄)	
Ethanol and Ethanol 	
Water and Water	
NH ₃ and NH ₃	
Cyclohexanone and Cyclohexanone 	
Cyclohexanol and Cyclohexanol 	
HCl and HCl	
CO ₂ and CO ₂	
CCl ₄ and CCl ₄	
CH ₂ Cl ₂ and CH ₂ Cl ₂ 	

2) If the pairs of substances listed below were mixed together, list the non-covalent interaction(s) that are involved.

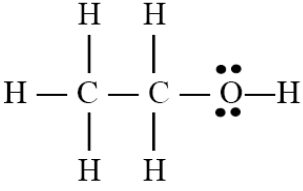
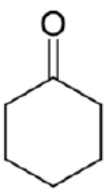
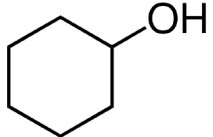
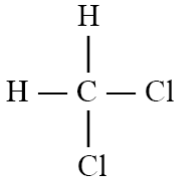
Choices:

- (A) Hydrogen Bonding
- (B) Dipole-Dipole
- (C) London Forces (induced dipole)
- (D) Ion-Dipole
- (E) Salt Bridges (ionic forces)

Compound Pairs	List of Non-covalent Interactions
NH ₃ and H ₂ O	
Mg ²⁺ and H ₂ O	
Cl ₂ and H ₂	
Acetic acid and H ₂ O $\begin{array}{c} \text{H} \quad \text{O} \\ \quad \\ \text{H} - \text{C} - \text{C} - \text{OH} \\ \\ \text{H} \end{array}$ Acetic Acid	
SO ₂ and H ₂ O	
SO ₂ and H ₂ S	
ethane (CH ₃ CH ₃) and methane (CH ₄)	

Key

1) Name the dominant (strongest) intermolecular force in the following pairs:

Compound	Dominant Force
Methane and Methane	London Forces
Ethanol and Ethanol 	Hydrogen Bonding
Water and Water	Hydrogen Bonding
NH ₃ and NH ₃	Hydrogen Bonding
Cyclohexanone and Cyclohexanone 	Dipole-Dipole
Cyclohexanol and Cyclohexanol 	Hydrogen Bonding
HCl and HCl	Dipole-Dipole
CO ₂ and CO ₂	London Forces
CCl ₄ and CCl ₄	London Forces
CH ₂ Cl ₂ and CH ₂ Cl ₂ 	Dipole-Dipole

2) If the pairs of substances listed below were mixed together, list the intermolecular force(s) that are involved.

Choices:

- (A) Hydrogen Bonding
- (B) Standard Dipole-Dipole
- (C) London Forces (induced dipole)
- (D) Ion-Dipole
- (E) Salt Bridges (ionic forces)

Compound Pairs	List of Intermolecular Forces
NH ₃ and H ₂ O	A, B, C
Mg ²⁺ and H ₂ O	D
Cl ₂ and H ₂	C
Acetate ion and H ₂ O $ \begin{array}{c} \text{H} \quad \text{O} \\ \quad \\ \text{H} - \text{C} - \text{C} - \text{OH} \\ \\ \text{H} \end{array} $ Acetic Acid	A,B,C
SO ₂ and H ₂ O	A,B,C
SO ₂ and H ₂ S	B,C
ethane (CH ₃ CH ₃) and methane (CH ₄)	C