

## A reminder about chemical bonds

### Exercise 1: Types of Bonds

Identify the type of bond (ionic or covalent) formed between the following pairs of elements:

1. Sodium (Na) and Chlorine (Cl)
2. Oxygen (O) and Hydrogen (H)
3. Calcium (Ca) and Fluorine (F)
4. Carbon (C) and Nitrogen (N)

#### Solutions:

**Ionic Bond:** Sodium donates an electron to chlorine, forming  $\text{Na}^+$  and  $\text{Cl}^-$ .

**Covalent Bond:** Oxygen shares electrons with hydrogen to form water ( $\text{H}_2\text{O}$ ).

**Ionic Bond:** Calcium donates two electrons to two fluorine atoms, forming  $\text{CaF}_2$ .

**Covalent Bond:** Carbon shares electrons with nitrogen to form compounds like CN.

### Exercise 2: Draw Lewis Structures

Draw the Lewis structures for the following molecules:

1. Water ( $\text{H}_2\text{O}$ )
2. Carbon Dioxide ( $\text{CO}_2$ )
3. Ammonia ( $\text{NH}_3$ )

### Exercise 3: Bond Strength and Order

Explain how bond strength is related to bond order using the following examples:

- I. Ethylene ( $\text{C}_2\text{H}_4$ )
- II. Acetylene ( $\text{C}_2\text{H}_2$ )