



# Lesson 11: Polyatomic Compounds (Nelson Textbook Pages 181-183)

# Learning Goals

- I can:
  - Write formulas for polyatomic ions and compounds containing them.
  - Name polyatomic ions and the compounds containing them.

# Polyatomic ions

- A **polyatomic ion** is a **group of atoms** that behaves like a **single atom**.
- Each polyatomic ion has **its own name, formula, and charge**.
- The group of atoms in a polyatomic ion **do not separate** when they **combine with other ions**.
- **Hydroxide, carbonate, and bicarbonate** are **NOT on the periodic table** because they are **not** elements, they are **compounds**.
- The prefix “**poly**” means “**more than one**”.

**Table 2** Common Polyatomic Ions and their Charges

Name of polyatomic ion	Ion formula	Ionic charge
ammonium	$\text{NH}_4^+$	1+
nitrate	$\text{NO}_3^-$	1-
hydroxide	$\text{OH}^-$	1-
bicarbonate (hydrogen carbonate)	$\text{HCO}_3^-$	1-
chlorate	$\text{ClO}_3^-$	1-
carbonate	$\text{CO}_3^{2-}$	2-
sulfate	$\text{SO}_4^{2-}$	2-
phosphate	$\text{PO}_4^{3-}$	3-

# Writing Formulas Using Criss-Cross Rule

- **Parentheses ()** are always needed when a subscript follows a polyatomic ion.
- Step 1: Write the **symbols**, with the **positive one first**.

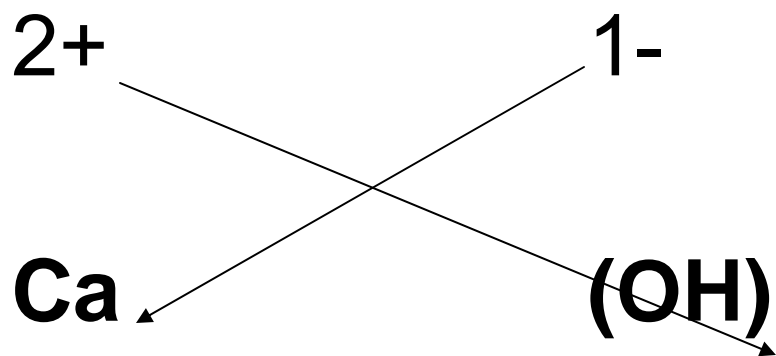
**Ca**

**OH**

Step 2: Write the **ionic charges** (Refer to ***Common Polyatomic Ions and Their Charge Table***).



Step 3: **Crisscross** the numbers, **drop** the signs, and write them as **subscript**.



- Step 4: The formula is **Ca(OH)<sub>2</sub>**
- **Ca** means there is 1 **Ca<sup>2+</sup>** ion.
- **(OH)<sub>2</sub>** means there are 2 **OH<sup>1-</sup>** ions.



# Naming Polyatomic Compound

- A **polyatomic compound** has **2 parts**:
  - a positive (metal) ion
  - a negative (polyatomic) ion
- To **name a polyatomic compound**:
- Name the **positive (metal) ion** first, using the name that appears on the **periodic table**.
- Name the **negative (polyatomic) ion** second.
- **DO NOT CHANGE** the **ending** of a polyatomic ion.

# Example:

- sodium + sulphate ion → sodium sulphate  
(Element) (polyatomic ion) (polyatomic compound)