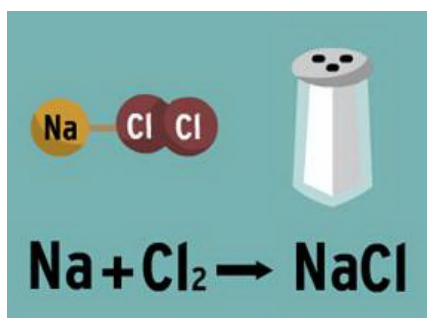


## How do you write Chemical Formulas?

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### Chemical Formula

A chemical formula of a compound is defined as a symbolic representation or notation of atoms constituting an element. The chemical or molecular formula identifies the number of particular [atoms](#) of each element present in a compound.



The molecular formula depends on the combining capacity or [valency of the elements](#). Therefore valency is used to find how the atoms of an element will combine with the atom(s) of another element to form a chemical compound.

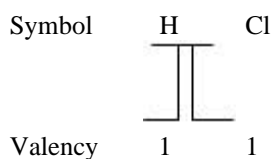
Sometimes in chemical formula [subscripts](#) are also used to represent the ratio of elements in the ionic or non molecular compounds. In case of [ionic compounds](#), chemical formulas are termed as Empirical Formulas.

Following steps are taken to write chemical formula of any compound:

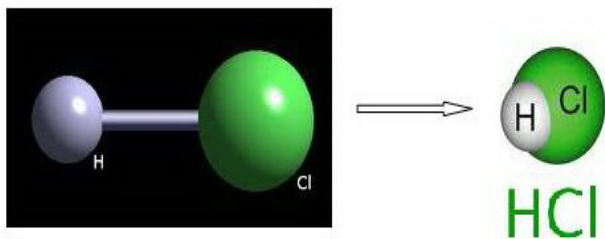
- Write down the symbol of an element
- Write down the valency of each of the element
- Cross over the valency

#### For example:

Formula of Hydrogen chloride



**Formula**     **HCl**



The valency of Hydrogen and chlorine is one, therefore molecular formula for hydrochloric acid is written as HCl

Beside the above steps, following three rules must be followed while writing a chemical formula

## Rules for writing Chemical Formula

### Rule 1:

The valency or charges present on the ion must balance each other.

#### For example

**1. Formula for water:** The valency of hydrogen is 1 and that of oxygen is 2. Therefore 2 H atom is required to balance single oxygen atom. Therefore chemical formula for water is written as H<sub>2</sub>O

Symbol	H	O
Valency	1	2

**Formula**    **H<sub>2</sub>O**

**2. Formula for Magnesium Chloride:** As the charges on magnesium and chloride ion is 2+ and 1- respectively. Therefore 2 chloride ions are required to balance single magnesium ion.

Symbol	Mg	Cl
Charge	2+	1-

**Formula**    **MgCl<sub>2</sub>**

### Rule 2:

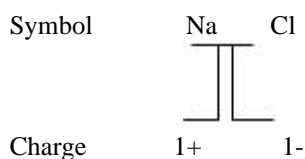
When a metal and non metal constitute a [chemical compound](#), then the symbol of metal is written before the symbol of non metal.

**For example:**

# NaCl

## Sodium Chloride

**1. Formula for Sodium chloride:** As sodium is a metal and oxygen is a non metal therefore sodium is written first while oxygen is written after it.



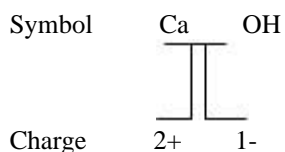
**Formula**      **NaCl**

### Rule 3:

When polyatomic ions form a chemical compound, the number of atoms is written after enclosing the [polyatomic ion](#) in brackets.

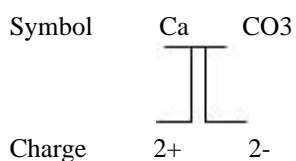
**For example:**

**1. Formula of calcium hydroxide:** The formula of calcium hydroxide is written as  $\text{Ca}(\text{OH})_2$ . Here, the bracket around OH with a subscript 2 indicates that there are two hydroxyl (OH) groups joined to one calcium atom.



**Formula**      **Ca(OH)<sub>2</sub>**

**2. Formula of calcium carbonate:** In this example, brackets are not required as it contains only one ion.

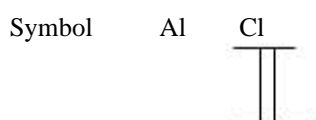


**Formula**      **CaCO<sub>3</sub>**

## Chemical Formula for other Compounds

**Other examples:**

**Formula for Aluminum Chloride:**




Charge    3+    1-

**Formula**     $\text{AlCl}_3$

### Formula for Copper Nitrate

Symbol    Cu    NO<sub>3</sub>



Charge    2+    1-

**Formula**     $\text{CuNO}_3$

### Formula for Aluminum Sulphate

Symbol    Al    SO<sub>4</sub>



Charge    3+    2-

**Formula**     $\text{Al}_2(\text{SO}_4)_3$

**Formula for Calcium Oxide:** As the valency of calcium and oxygen is same but to simplify the formula we write CaO instead of Ca<sub>2</sub>O<sub>2</sub>.

Symbol    Ca    O



Charge    2+    2-

**Formula**     $\text{CaO}$

**Write the chemical formula of Magnesium carbonate, Phosphorus penta chloride, and Hydrogen sulphate.**

Try to answer. Still need help? Want to know more about writing chemical formulas? [Click here](#) to schedule live help from a certified tutor!

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