**IUPAC:** International Union of Pure and Applied Chemistry

This organization is responsible for the standardized symbols and names that are used internationally.

**Element Symbols:** Element symbols are typically given by their first or first two letters of their names. Some were named after their Greek or Latin names. Ex. Pb

<table>
<thead>
<tr>
<th>Element</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Pb</td>
</tr>
<tr>
<td>Plumbum</td>
<td>Pb</td>
</tr>
<tr>
<td>Iron</td>
<td>Fe</td>
</tr>
<tr>
<td>Ferrous</td>
<td>Fe</td>
</tr>
</tbody>
</table>

**Compounds**

Compounds are represented by chemical formulas. The formula tells us:

- Letters tell us which elements are present
- Numbers tell us how many atoms of each element
- Subscript letters tell us the state.

\[
\text{H}_2\text{O}\text{(l)}
\]

- Oxygen is liquid
- Hydrogen is gas
### Common Compounds

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baking Soda</td>
<td>NaHCO$_3$(s)</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>CO$_2$(g)</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>H$_2$O$_2$(l)</td>
</tr>
<tr>
<td>Glucose</td>
<td>C$<em>6$H$</em>{12}$O$_6$(s)</td>
</tr>
<tr>
<td>Methane</td>
<td>CH$_4$(g)</td>
</tr>
<tr>
<td>Lye</td>
<td>NaOH$_{(s)}$ or (aq)</td>
</tr>
<tr>
<td>Table salt</td>
<td>NaCl$_{(s)}$</td>
</tr>
</tbody>
</table>

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Science 14:

Complete "Interpreting Chemical Formulas"
AND questions 1-3 on page 37
Science 10: Compounds in Detail

Ionic Compounds

- form when electrons are transferred from one atom to another.
- Positive ions are attracted to negative ions
- Form a crystal lattice

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**Fun Facts on Ionic Compounds**

- Form between metals and non-metals
- Solids at room temperature
- Very High melting points (**Salt melts 800 °C**)
- Dissolve in water
- Can conduct electricity when dissolved in water.
**Naming Ionic Compounds**

1. Name the cation first by using the element's name *(metal)*

2. Name the anion second by using the first part of the element's name, and change the last part to -ide *(non-metal)*

**Examples:**

<table>
<thead>
<tr>
<th>Formula</th>
<th>Cation</th>
<th>Anion</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaCl(s)</td>
<td>Sodium</td>
<td>Chloride</td>
<td>Sodium Chloride</td>
</tr>
<tr>
<td>BaF(s)</td>
<td>Barium</td>
<td>Fluoride</td>
<td>Barium Fluoride</td>
</tr>
<tr>
<td>K₃N(s)</td>
<td>K</td>
<td>N</td>
<td>Potassium Nitride</td>
</tr>
</tbody>
</table>

**Writing Formulas for Ionic Compounds**
(Basically, remember thatIonic compounds want to be neutral)

**Steps:**

1. Identify the ions and their charges
2. Determine the total charges needed to balance
3. Note the ration of cations to anions
4. Use subscripts to write the formula if needed.

**Example:** aluminium chloride

\[
\begin{align*}
\text{Example: aluminium chloride} & \\
\text{Al}^{3+} & \text{Cl}^{-} \\
\end{align*}
\]

\[
\begin{align*}
\text{Al}^{3+} & \text{Cl}^- \text{Cl}^- \text{Cl}^- \text{Cl}^- & 1 : 3 \\
\text{AlCl}_3 & \\
\end{align*}
\]
## Using Least Common Multiples

<table>
<thead>
<tr>
<th>Steps</th>
<th>Example: calcium nitride</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify the ions and their charges</td>
<td>![Ca$^{2+}$ N$^{3-}$]</td>
</tr>
<tr>
<td>2. Find the lowest number that both charges divide into.</td>
<td>$6$</td>
</tr>
<tr>
<td>3. Divide each charge into the lowest common multiple, and write this number as the subscripts.</td>
<td>$6 \div 2 = 3$, $6 \div 3 = 2$</td>
</tr>
</tbody>
</table>

### Multivalent Elements

1. Multivalent elements can be stable at **more than one charge**. (example: Fe$^{2+}$ and Fe$^{3+}$)

2. We use **roman numerals** in the names of compounds using multivalent elements to show which charge is being used. (Example: chromium (VI) sulfide use the Cr$^{6+}$ charge)

Example: Write the name for Cu$_3$N

- Cu$^{1+}$ N$^{3-}$
- Cu$^{1+}$ N$^{3-}$ (Copper (I) Nitride)
Polyatomic Ions

- Basically, a group of atoms, acting as one single ion

- When naming a compound that uses a polyatomic ion, don’t change the ending to ide. 
  Ex: Na₃PO₄

Examples:

1. What is the formula for iron(III) sulfate?

\[
\text{Fe}^{3+} \quad \text{SO}_4^{2-} \quad \text{Fe}^{3+} \quad \text{SO}_4^{2-} \\
\text{Fe}_2(\text{SO}_4)_3
\]
Science 10 Practice:

A: Write the formulas for the following ionic compounds
1. magnesium chloride
2. sodium sulfide
3. calcium phosphide
4. potassium nitride
5. calcium flouride

B: Write the names of the following compounds
1. FeCl$_3$(s)
2. PbO$_2$(s)
3. Ni$_2$S$_3$(s)
4. Ag$_3$N(s)

C: Write the formulas of the following ionic compounds
1. barium hydroxide
2. iron (III) carbonate
3. copper (I) permanganate

D: Write the names of the following ionic compounds:
1. Au(No$_3$)$_3$(s)
2. (NH$_4$)$_3$PO$_4$(s)
3. K$_2$Cr$_2$O$_7$(s)