

SNC1D CHEMISTRY

ATOMS, ELEMENTS, & COMPOUNDS

☞ Chemical Names & Formulas (P.218-227)

Chemical Names

Like many substances, ionic and molecular compounds have both chemical names and common names. To name an ionic compound such as sodium chloride, write the name of the metal first: sodium. Then write the name of the non-metal and change its ending to "ide": chloride.

NOTE!

*This is just **one** rule for naming ionic compounds. Other ionic compounds have different rules for naming.*

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Chemical Names

PRACTICE

- What are the chemical names of the following compounds?
 - CaCl_2 ☞ *used in bleaching powder and melting ice*
 - CaO ☞ *used in plaster for construction (quicklime)*
 - CuCl ☞ *used to make red coloured glass*
 - KI ☞ *added to "iodized" table salt*
 - AgCl ☞ *used in photography*

- calcium chloride
- calcium oxide
- copper chloride
- potassium iodide
- silver chloride

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Chemical Names

To name a molecular compound prefixes like *mono*, *di*, *tri*, ... are used to represent the number of each atom present in the molecule. For example, when carbon and oxygen combine you get the molecular compound: carbon dioxide (CO_2).

NOTE!

You will learn more about naming both ionic and molecular compounds in Grade 10.

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Chemical Names

PRACTICE

2. What are the chemical names of the following compounds?

- (a) CO_2 ⇒ *dry ice*
 (b) CH_4 ⇒ *natural gas (methane)*
 (c) NH_3 ⇒ *ammonia*
 (d) CO ⇒ *a silent killer*
 (e) H_2O ⇒ *water*

- (a) carbon dioxide
 (b) carbon tetrahydride
 (c) nitrogen trihydride
 (d) carbon monoxide
 (e) dihydrogen monoxide

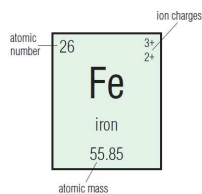
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Chemical Formulas

Chemical formulas are used to represent compounds, but how do we know the proportions of each element in the compound? After performing many experiments, scientists discovered patterns in the ability of different elements to combine to form compounds. This ability is called the **combining capacity** and is similar to the number of connections or bonds that an atom can make.



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Chemical Formulas

The combining capacity is also equal to the element's **ion charge**, which is indicated in the top right corner of the element's square on the periodic table. Most elements have only one combining capacity. However, some elements, such as iron, nickel, and copper to name a few, have more than one combining capacity.

NOTE!
You will learn more about writing chemical formulas both ionic and molecular compounds in Grade 10.

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Chemical Formulas

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Chemical Formulas

PRACTICE

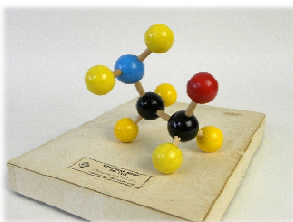
3. The elements in group 18 do not have an ion charge. Explain.

they are the noble gases – they are stable and non-reactive

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Building Molecular Models

Chemical formulas indicate how many atoms of each element there are in a molecule, but they do not convey any sense of the 3D nature of molecules. As such, chemists use models to gain information about the shape of a molecule. The shape of the molecule is a good predictor of its properties.



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Building Molecular Models

In these models, the atoms are held together by connections called bonds (the connections represent the electrons that "glue" or bond the atoms together).



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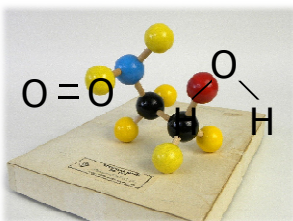
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Building Molecular Models

NOTE!

The molecules can also be represented by drawings on paper called **structural diagrams**. In these diagrams, each atom is represented by its chemical symbol and each bond is represented by a straight line drawn between the symbols.



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Building Molecular Models

STRUCTURAL DIAGRAM

- ❖ pencil and paper drawing of a molecule
- ❖ shape is a good predictor of its properties
- ❖ atom \leftrightarrow chemical symbol
- ❖ bond \leftrightarrow straight line

$O=O$
 $\begin{array}{c} O \\ / \quad \backslash \\ H \quad H \end{array}$

NOTE!
In some cases, more than one bond can exist between the same two atoms.

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Building Molecular Models

As was discussed earlier, most elements form a fixed number of bonds – indicated by the ion charge – no more and no fewer. The table lists the number of bonds that each element will make.

Element	Symbol	Colour	# of Bonds
hydrogen	H	red	1
chlorine	Cl		1
oxygen	O	white	2
sulphur	S		2
nitrogen	N		3
carbon	C	black	4

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Activity: Building Molecular Models (B23/P.216)



INSTRUCTIONS

- Read the activity "B23: Building Molecular Models".
- Follow the instructions given (i.e. procedure 1 to 4).
- Answer the questions given (i.e. questions 5 and 6).
- Submit your sketches and answers.


NOTE:

- Add nitrogen gas (N_2) and methane (NH_3) to the list.
- Be sure to include a chemical formula, a common use/name, and a structural diagram for each molecule!
- Each molecule is complete when all the balls are connected in such a way that all the holes are filled.
- In some cases, it is possible for more than one connection to exist between the same two atoms (i.e. a double bond or triple bond).

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 **Check Your Learning** 

WIKI (CHEMISTRY)

 1DCHEM - QUIZ#3 (Atomic Structure)

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