A molecule is ***triatomic*** when it
s three atoms. *Example :* Ozone O_3.

A molecule is ***polyatomic*** when it
s more than three atoms.

ample : • Phosphorus [P_4] which
s four atoms in its molecule.

ulphur [S_8] which contains eight atoms
olecule.

lecules of compounds : When atoms
or more elements combine, they form a
e of a compound.

es :

water molecule is formed by two
ns of hydrogen and one atom of oxygen.

olecule of carbon-dioxide is formed by
atom of carbon and two atoms of oxygen.

e combination of atoms to form
les of different elements and
nds can be represented diagramma-
(Table 4.5).

: Diagrammatic representation of molecules

es of Elements	*Molecules of Compounds*
H H HYDROGEN MOLECULE	H Cl HYDROGEN CHLORIDE MOLECULE
Cl Cl CHLORINE MOLECULE	O H H WATER MOLECULE
N N NITROGEN MOLECULE	
O O OXYGEN MOLECULE	Zn O ZINC OXIDE MOLECULE
O O O OZONE MOLECULE	O C O CARBON DIOXIDE MOLECULE

of zinc, gold, copper and helium also represent their molecules]

can be represented by a formula which is accepted universally all over the world.

A formula* (plural : *formulae*) *is a short way of representing the molecule of an element or a compound.

It is meant to save time, space and energy.

Formulae of elements : In case of an element, each molecule is made up of a definite number of atoms. The number of atoms in a molecule of an element is called its **atomicity**. While writing the formulae, atomicity is mentioned as sub-script along with the short form of the element. Normally subscript 1 (one) is not written. *Examples :*

1. We write the formulae of monoatomic element by simply writing their symbols.
   e.g. Helium (He), Potassium (K), Sodium (Na), Calcium (Ca), etc.
2. If an element is diatomic, we write the subscript 2 along with the symbols.
   e.g. Hydrogen (H_2), Oxygen (O_2), Nitrogen (N_2), Chlorine (Cl_2), etc.
3. We follow the above method in writing the formulae of triatomic and poly atomic elements.
   e.g. Ozone is written as O_3, Phosphorus is written as P_4 and Sulphur is written as S_8.

Formulae of compounds : Compounds are formed by the combination of the atoms of more than one element. Atoms combine with each other in whole numbers, which can be 1, 2, 3 or more. This whole number is the combining capacity of the elements.

For example, water is a compound of hydrogen and oxygen. Two atoms of hydrogen combine with an atom of oxygen to form a molecule of water. This is represented by the formula, H_2O. Therefore, the whole number ratio in which hydrogen and oxygen

Table 4.6 : Formulae of molecules of some common elements

Elements	*Formulae of molecules*	*Atoms in one molecule*	*Atomicity*
Metals			
Iron	Fe	1	Monoatomic
Zinc	Zn	1	Monoatomic
Copper	Cu	1	Monoatomic
Magnesium	Mg	1	Monoatomic
Lead	Pb	1	Monoatomic
Calcium	Ca	1	Monoatomic
Sodium	Na	1	Monoatomic
Cobalt	Co	1	Monoatomic
Chromium	Cr	1	Monoatomic
Gold	Au	1	Monoatomic
Manganese	Mn	1	Monoatomic
Silver	Ag	1	Monoatomic
Mercury	Hg	1	Monoatomic
Non-metals			
Carbon	C	1	Monoatomic
Hydrogen	H_2	2	Diatomic
Nitrogen	N_2	2	Diatomic
Oxygen	O_2	2	Diatomic
Fluorine	F_2	2	Diatomic
Chlorine	Cl_2	2	Diatomic
Bromine	Br_2	2	Diatomic
Iodine	I_2	2	Diatomic
Ozone	O_3	3	Triatomic
Phosphorus	P_4	4	Polyatomic
Sulphur	S_8	8	Polyatomic
Metalloids			
Antimony	Sb	1	Monoatomic
Arsenic	As	1	Monoatomic
Inert gases			
Helium	He	1	Monoatomic
Neon	Ne	1	Monoatomic

Note : • From the above table it is clear that molecules of metals, metalloids and inert gases are monoatomic, *i.e.* their atoms exist freely.

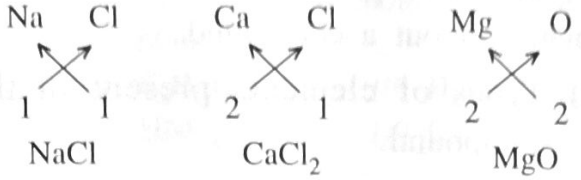
- Hydrogen, nitrogen, oxygen, fluorine and chlorine are gaseous non-metallic diatomic elements.

In 2H and H_2 — 2H represents two atoms of hydrogen while H_2 represents one molecule of hydrogen.

In $2O_2$ and 2O — $2O_2$ represents two molecules of oxygen while 2O represents two atoms of oxygen.

atoms combine is 2 : 1. That means, the combining power of hydrogen is 1 and that of oxygen is 2.

Now, let us look at the formulae of some common compounds like sodium chloride, calcium chloride and magnesium oxide. First, write down the symbols of the elements side by side that form the compound. Under each symbol, write down the combining power of the element. Then interchange the combining power to obtain the chemical formula of a compound. *Example :*



Note : *Do not write down the subscript numbers if they are the same.* For example, *the formula of magnesium oxide is MgO, not* Mg_2O_2.

Student activity

Following are the combining powers of the constituting elements of the compounds shown in the table. Now write down the formulae for these compounds :

Combining power : Na : 1, Cl : 2, Fe : 2, Zn : 2
Al : 3, O : 2, S : 2, Cl : 1

1. Iron oxide
2. Iron sulphide
3. Sodium oxide
4. Calcium oxide
5. Calcium sulphide
6. Zinc chloride
7. Zinc sulphide
8. Aluminium oxide
9. Aluminium chloride

Table 4.7 : Molecular formulae of some gaseous compounds

Compounds	*Formula*	*Compounds*	*Formula*
1. Carbon dioxide	CO_2	6. Hydrogen sulphide	H_2S
2. Carbon monoxide	CO	7. Nitrogen dioxide	NO_2
3. Sulphur dioxide	SO_2	8. Nitric oxide	NO
4. Sulphur trioxide	SO_3	9. Nitrous oxide (Di nitrogen oxide)	N_2O
5. Ammonia	NH_3		

Table 4.8 : Formulae of some metallic oxides and metallic sulphides

Metallic oxide	*Formula*	*Metallic sulphides*	*Formula*
1. Magnesium oxide	MgO	7. Magnesium sulphide	MgS
2. Calcium oxide	CaO	8. Calcium sulphide	CaS
3. Iron (II) oxide	FeO	9. Iron (II) sulphide	FeS
4. Copper oxide	CuO	10. Copper sulphide	CuS
5. Zinc oxide	ZnO	11. Zinc sulphide	ZnS
6. Lead oxide	PbO	12. Lead sulphide	PbS

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Wk	M	T	W	T	F	S	S
40				1	2	3	4
41	5	6	7	8	9	10	11
42	12	13	14	15	16	17	18
43	19	20	21	22	23	24	25
44	26	27	28	29	30	31	

APPOINTMENT / MEETING

Class - VI
Subject Chemistry
Chapter - 4 Element, Compound, Symbol and Formula Part - 5

(1) What is formula? Give eg.

(2) What is atomicity?

(3) Calculate the atomicity for the following

CO_2 total no. of atoms
C = 1
O = 2
CO_2 (1+2) = 3 CO_2 triatomic

H_2O, O_3, SO_2, N_2, SO_3, NH_3, Cl_2, O_2

(4) Give the formula of the following
(1) Calcium oxide
(2) Zinc oxide
(3) Lead oxide
(4) Magnesium Sulphide
(5) Iron (II) Sulphide

NOTES