Cosmo School

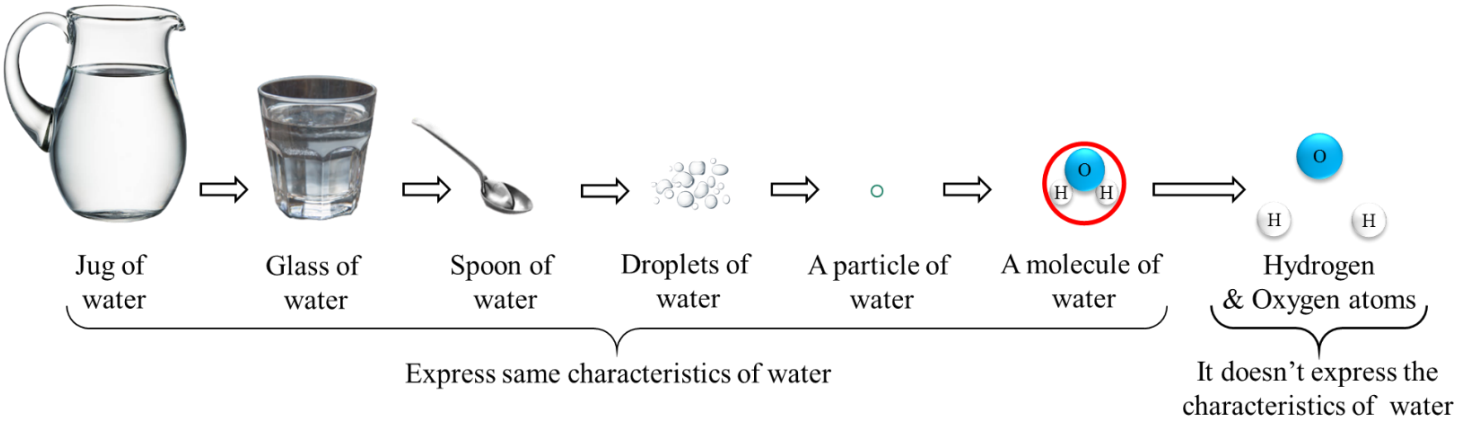
Work Sheet: 01

Science (Chapter-08: Chemical Reaction)

Class: VIII

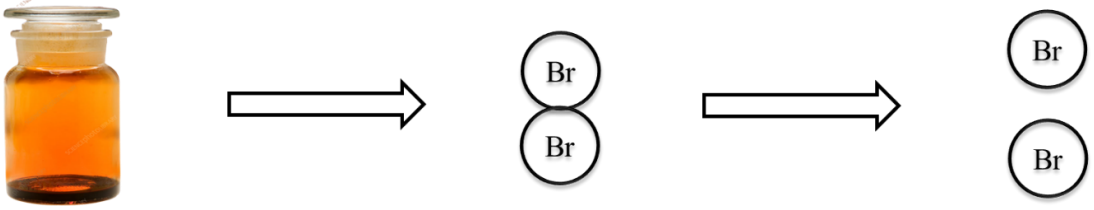
Name of the student: .....*Date:* ...../...../.....

❖ Molecule and atom:



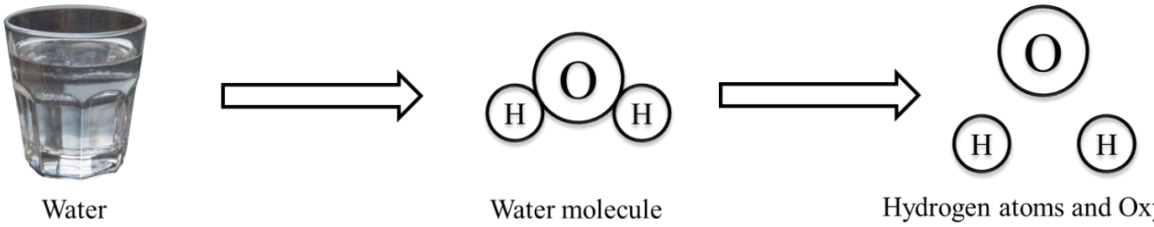
- A tiny particle of matter, which can stay independently retaining the properties of that matter is called a molecule.
- The smallest particles that make up a molecule, which have no independent existence, are called atoms.

➢ The molecules that break down to form one type of atom are called elementary molecules.



➢ Substances that are made up of only one type of molecule, the molecule that breaks down to form one type of atom, are called elemental substances.

✓ The molecules that break down to form more than one type of atom are called composite molecules.



✓ Substances that are made up of only one type of molecule, which can be broken down into more than one type of atom, are called composite substances.

Q. Why is H_2O a molecule?

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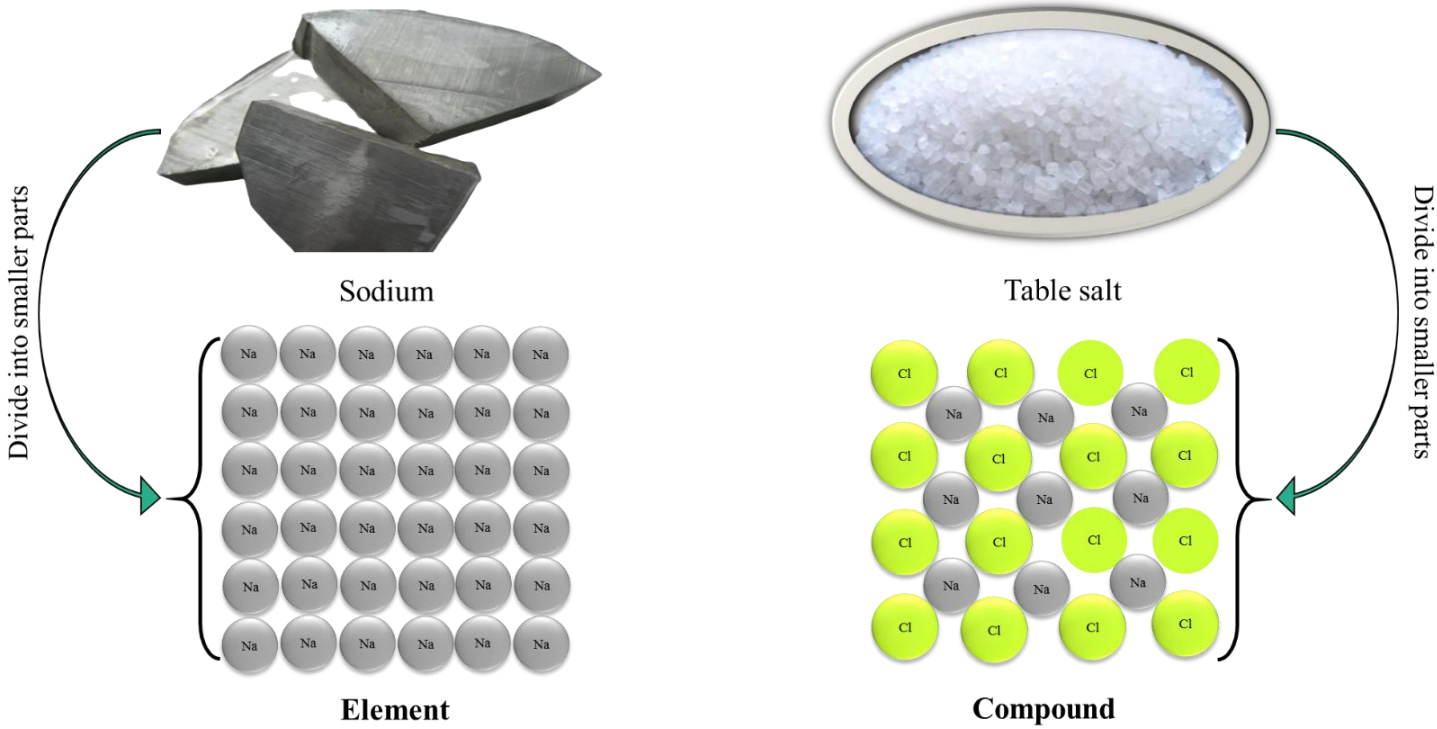
❖ Element & Compound:



➢ 118 elements have been found out so far but the number of compounds is innumerable.

Q. Why is iron an element?

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Q. Why is Sodium chloride a compound?

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❖ Symbol of elements:

Symbol with English name

Element	Symbol	
Hydrogen	H	First one letter
Oxygen	O	
Nitrogen	N	

Element	Symbol	
Helium	He	First two letters
Aluminium	Al	
Silicon	Si	

Element	Symbol	
Clorine	Cl	First one letter and emphasizing letter
Cromium	Cr	
Magnesium	Mg	

Symbol with Latin nam

Element	Latin Name	Symbol	
Potassium	**K**alium	K	First one letter
Tungsten	**W**olfram	W	

Element	Latin Name	Symbol	
Gold	**Au**rum	Au	First two letters
Copper	**Cu**prum	Cu	
Iron	**Fe**rrum	Fe	
Sodium	**Na**trium	Na	

Element	Latin Name	Symbol	
Silver	**Arg**entum	Ag	First One letter and emphasizing letter
Mercury	**H**ydrar**g**yrum	Hg	
Lead	**P**lum**b**um	Pb	
Antimony	**S**ti**b**ium	Sb	
Tin	**Sn**annum	Sn	

➢ Short expression of the element is called **symbol**.

❖ Formula of molecule of element & compound:

➢ In a molecule of an element, all the atoms are same.

For example, in a molecule of oxygen (O_2), both of the atoms are oxygen.

➢ In a molecule of a compound, all the atoms are different.

For example, in a molecule of water (H_2O), there is one oxygen atom and two hydrogen atom

Molecule of element	Formula
Hydrogen	H_2
Oxygen	O_2
Ozone	O_3
Nitrogen	N_2
Chlorine	Cl_2

Molecule of Compound	Formula
Water	H_2O
Carbon dioxide	CO_2
Quick lime	CaO
Caustic soda	NaOH
Limestone	$CaCO_3$

➢ The short expression of the molecule of an element or a compound is called formula.

Q. What type of molecule is SO_2 and why?

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Q. What type of molecule is Br_2 and why?

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❖ **Radicals or Free Radicals:**

In chemistry, radicals are—

- group of atoms
- do not stay independently
- participate in compound formation like elemental atom

Suppose,

- In NH_4^+, there are 5 atoms. So, it is a group of atoms.
- NH_4^+ is chemically reactive. So, it does not stay independently
- Ammonium and Carbonate form Ammonium carbonate, $(NH_4)2CO_3$

Q. Why is CO_3^{2-} a radical?

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❖ How to write the formula of a compound?

- The valency of the element means the number of hydrogen atom attached to that element.
- Valency of elements = Our hand

Suppose, oxygen can be attached with two hydrogen atoms as oxygen has two hands. So, the valency of oxygen is 2.

- The valency of element A is x
- The valency of element B is y
- The formula of compound with A and B is AyBx

- The valency of P is 4
- The valency of Q is 2
- The formula of compound with P and Q is $P_2Q_4 = P_1Q_2 = PQ_2$

- ✓ The valency of Ammonium (NH_4^+) is 1
- ✓ The valency of Sulphate (SO_3^{2-}) is 2
- ✓ The formula of compound with Ammonium and Sulphate is $(NH_4)_2(SO_4)_1 = (NH_4)_2SO_4$

Q. Write the formula of compounds formed with the following elements and radicals.

Elements & Radicals	Compound	Elements & Radicals	Compound
Na & CO_3^{2-}		Cu & SO_4^{2-}	
Mg & Cl		C & H	
Zn & SO_4^{2-}		Fe (us) & O	
NH_4^+ & PO_4^{3-}		Pb (us) & NO_3^-	
Al & OH^-		Na & HCO_3^-	