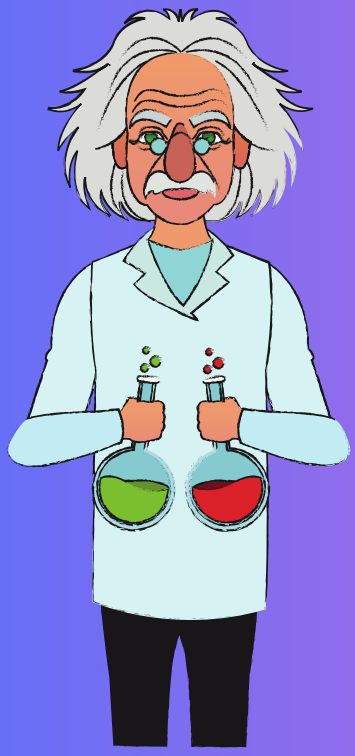
K-Chemistry

SABIS CHEMISTRY

Grade 10



Final Revision Chapter 3

Mr. Hisham Mahmoud

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Chapter 3

- Know qualitative properties of NO, NO2, H2, Cl2, O2, HCl, NH3: color
- . Know qualitative properties of NO, NO2, H2, Cl2, O2, HCl, NH3: reaction with air
- . Know qualitative properties of NO, NO2, H2, Cl2, O2, HCl, NH3: effect on litmus paper
- . Know qualitative properties of NO, NO2, H2, Cl2, O2, HCl, NH3: solubility
- . Gay-Lussac Law of combining volumes: when gases react they always do so they
- always do so in ratios of small whole numbers
- **. Avogadro's hypothesis: at the same temperature and pressure equal volumes of different gases contain the same number of particles.**
- . Avogadro's hypothesis does not apply to liquids and solids.

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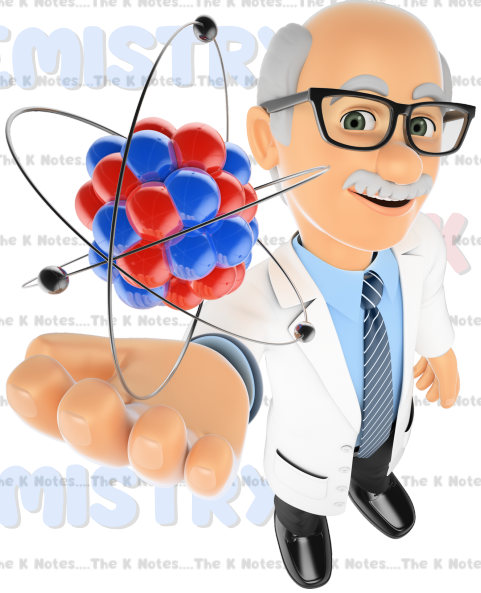
Chapter 3

Dalton's atomic theory:

1. The simplest substances found in nature are called elements.
2. Each element consists of identical tiny particles called atoms
3. Atoms of one element are all identical.
4. Element combine to form compounds. One atom of one element combines with one
5. atom of another element to form one molecule of a compound.
6. The smallest particle of a compound is a molecule.
7. Atoms cannot be created or destroyed



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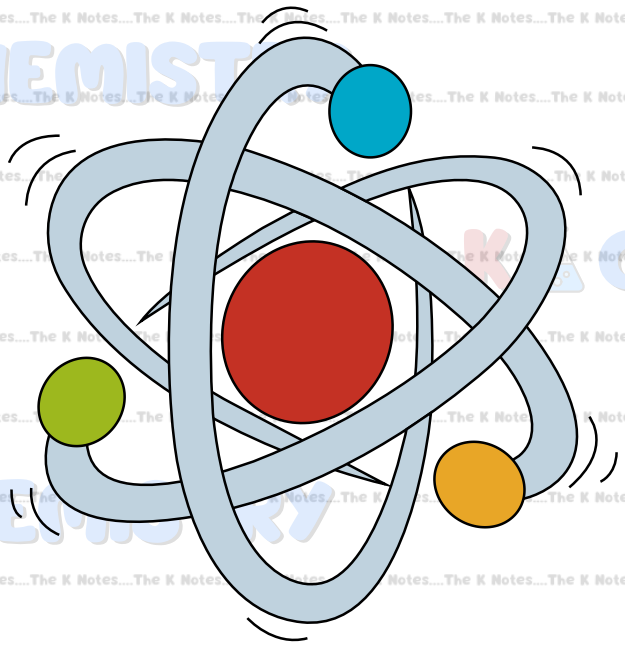
Atomicity: number of atoms in a molecule

Chemical **coefficient**: always indicates the number of particles. For eg: 3Na stands for three separate atoms while 3CO2 stands for 3 separate molecules of CO2.

A **subscript**: indicates the number of a specific atom per formula or molecule. For eg 3CO2 stands for 3 separate molecules of CO2 each containing 1 atom of C and 2 atoms of O.



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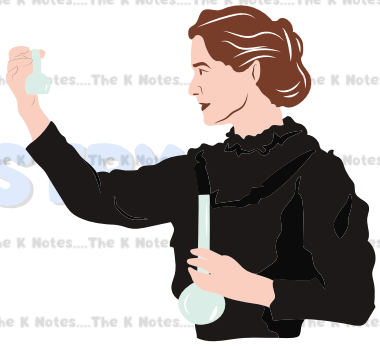
Operational definition of a pure substance: a substance that cannot be separated into its components by physical means.
The physical properties of **pure** substances must be fixed and constant.

Conceptual definition of a pure substance: a substance that contains one kind of particles (atoms or molecules)

To identify an unknown **pure** substance we determine its physical constants and compare them with listed values.

A pure substance is either an element or a compound



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Operational definition of a compound: pure substance that can be split into simpler substances.

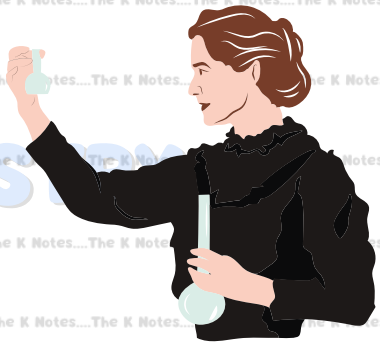
Conceptual definition of a compound: a pure substance containing more than one type of atoms.

Some compounds are not made of molecules:

* Table salt(NaCl, sodium chloride) ionic solid made up of ions.
* Sand (SiO_2, silicon dioxide) network solid made up of atoms.

Operational definition of an element: a pure substance that cannot be split into simpler substances by physical means or through chemical reactions.

Conceptual definition of an element: a pure substance made up of one kind of atoms.



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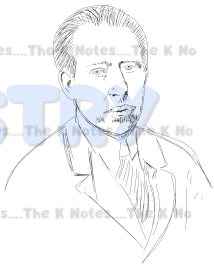
Mixtures: are made up at least of 2 different pure substances.



Mixtures do not have fixed composition.

Mixtures contain more than one type of particles

Homogeneous mixtures (solutions): all components exist in one phase.

Heterogeneous mixtures: components of a heterogeneous mixture exist into more than one phase

Recognize symbols of atoms and elements

Chemical formula of molecular compounds: also known as the molecular formula, gives the number and the kind of atoms of each element in a molecule of that compound.

It can be used to obtain the simplest ratio of atoms in the molecular compound.

Chemical formula of ionic compounds: also known as the empirical formula, gives the kind of ions present and the simplest ratio in which they are found in the compound.

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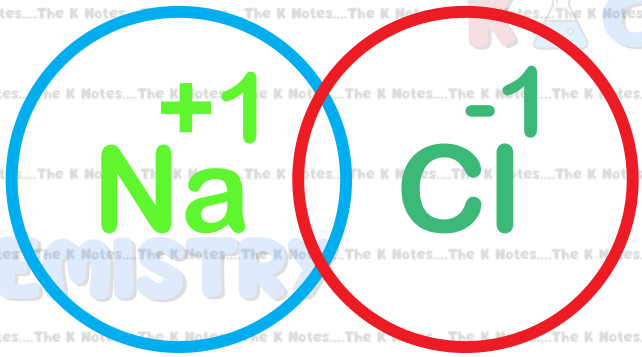
Since ionic solids, network solids and metals are not made up of molecules, their chemical formula is not a molecular formula. SQ28

Simplest formula of molecular compounds: gives the simplest ratio in which the atoms are found together.

Simplest formula of salt: gives the simplest ratio in which the ions are found together.

Simplest formula can be deduced from chemical formula.

Binary compounds: are compounds made up of two types of atoms.



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Rules for naming molecular binary compounds:

The first element in the formula is named first, using the first element name.

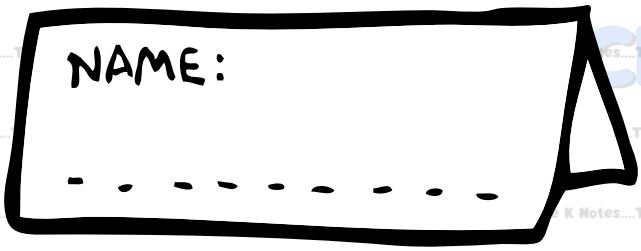
The second element is named by taking the root of the element and adding -ide.

Prefixes are used to denote how many atoms are present.

The prefix mono is never used to name the first element.

Note: we never use prefixes when naming acidic compounds like HCl (hydrogen chloride)

Chemists use '-' to represent a bond between two atoms.



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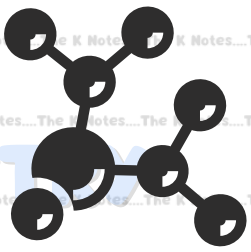
The structural formula shows the number and the kind of atoms of each element in a molecule of that compound (everything that the molecular formula shows) and how atoms are bonded to each other in the molecule.

Molecular models: are physical models that represent molecules and give an idea about their 3-dimensional shape (geometry of the molecule). They consist of balls, representing atoms, joined together by sticks or springs. Molecular models help us visualize molecular shapes



Particles in the solid state are closely packed and vibrate in fixed position. Particles of a solid cannot flow. A solid has a fixed shape and a fixed volume. Solids cannot be compressed.

Particles of a gas are far apart and are in constant random motion. A gas has no fixed volume and no fixed shape. A gas can be compressed.

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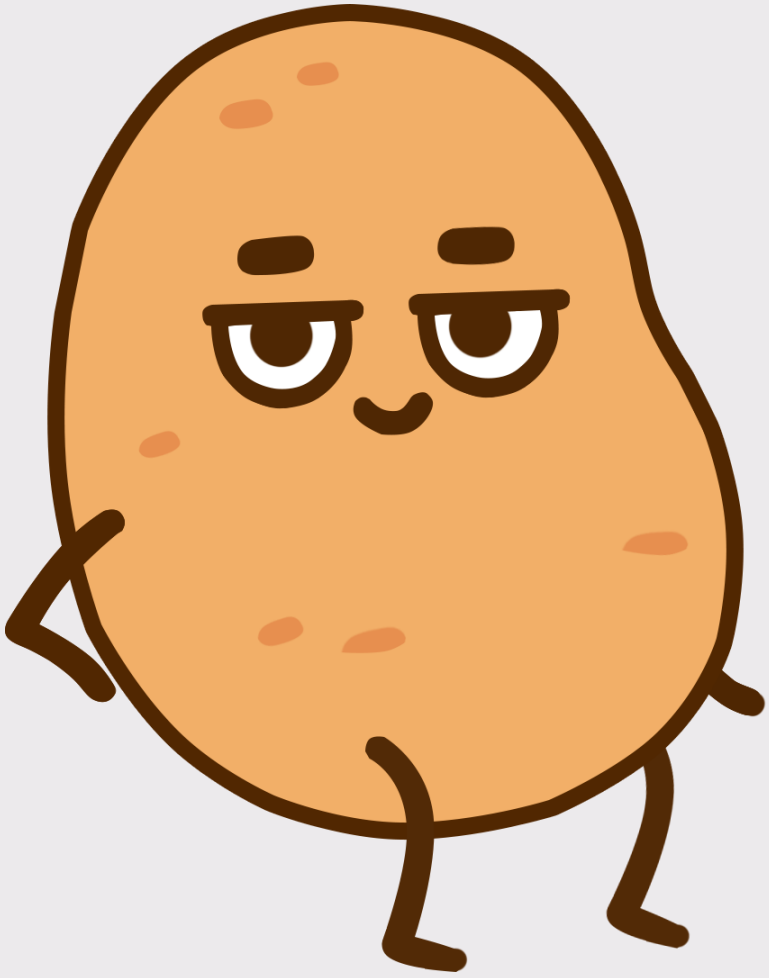

see you next part

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