Lesson 3 (Matter and its properties)

Substance classification into (mixtures/pure substances)

- Mixtures (homogeneous mixtures - heterogeneous mixtures)
- Pure substances (elements - compounds)

Mixtures :-

Substances consisting of one or more substances that are not chemically combined and the components can be separated by physical methods

The physical methods for separating the components of mixtures:-

1- Magnetic separation (iron filings can be separated from sand using magnets)
2- Filtration
3- Evaporation and condensation

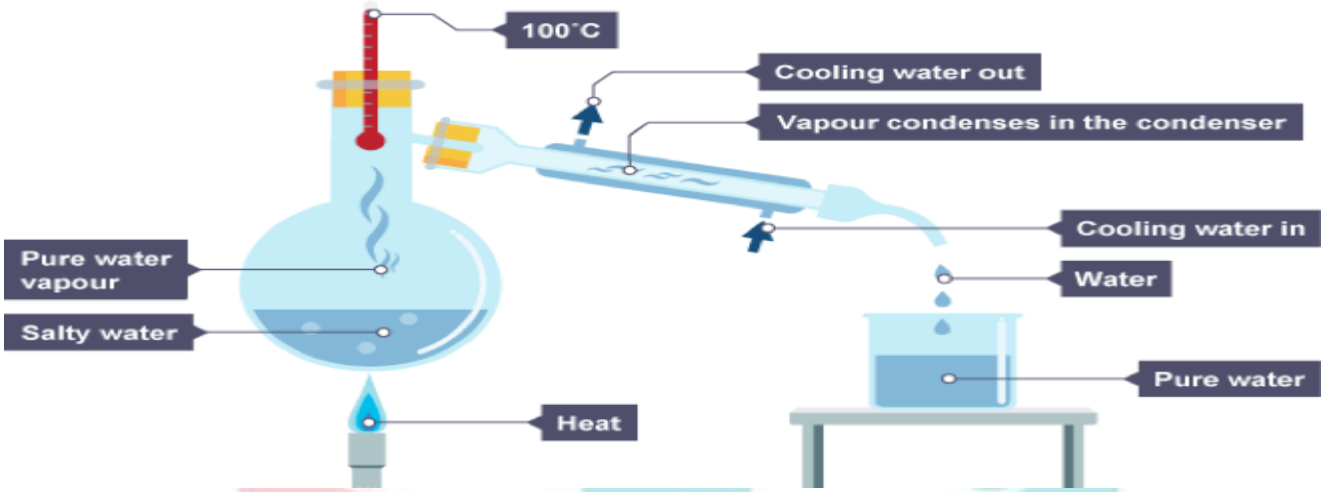
Homogeneous mixtures:-

- A mixture whose components cannot be **distinguished by the naked eye**
- It is called a **solution**
- Example: table salt solution

An example of a **homogeneous mixture**: salt can be separated from water by **evaporation and condensation**

Evaporation and condensation:-

A method used to separate the components of a **solution from a solid dissolved in water**



Heterogeneous mixture:-

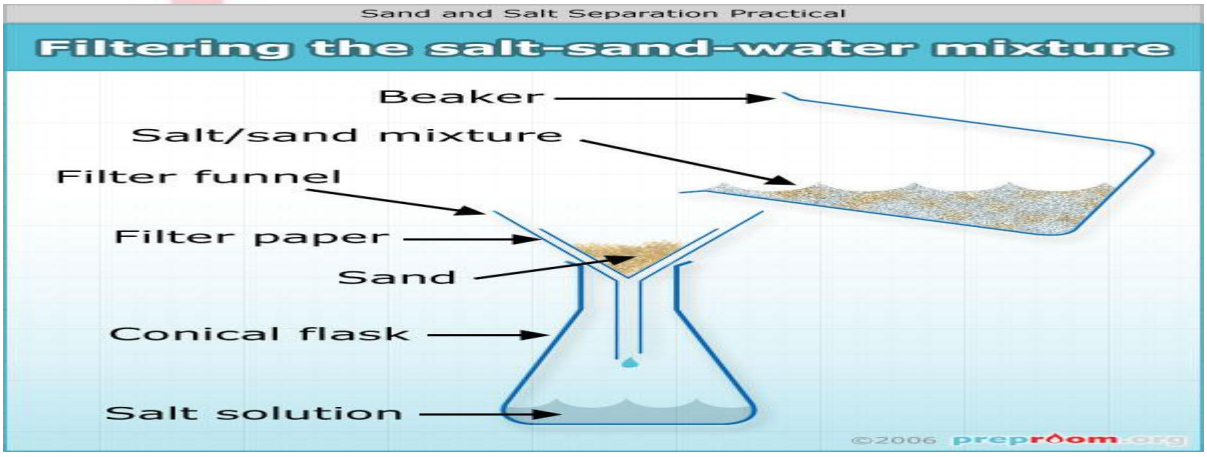
A mixture whose components can be **distinguished by the naked eye**

Example: mixture of sand in water

The sand can be separated from the water again by using the filtration process

Filtration:-

A method used to **separate a solid** that is **not dissolved in water** using a **filter paper inside a filter funnel**



Pure materials:-

Substances whose components cannot be **separated by physical methods**

Such as (**elements - compounds**)

Elements:-

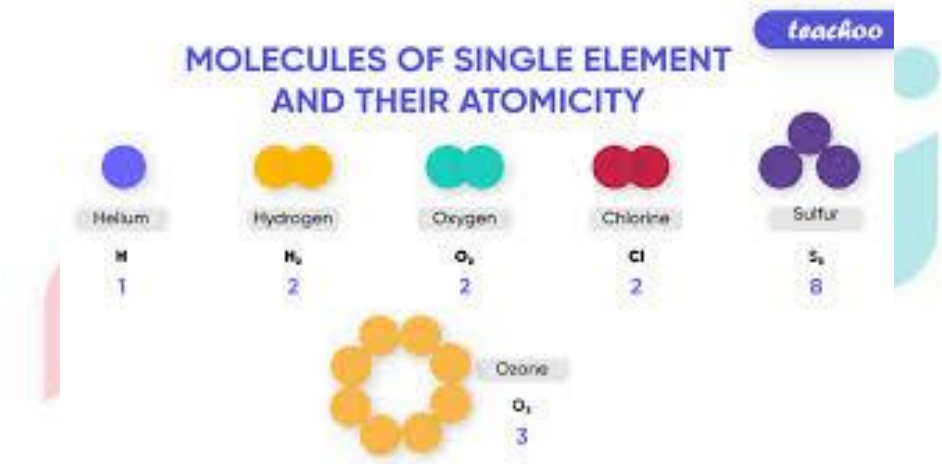
The simplest, pure form of matter. Only what is simpler than it can be analyzed by physical and chemical methods

Element molecule :-

An element's molecule is composed of one type of identical atom

it may be >>>

- ❖ **molecule of one atom (carbon molecule)**
- ❖ **Diatomic molecule (oxygen molecule)**
- ❖ **Polyatomic molecule (ozone molecule)**



Compounds:-

A pure substance formed as a **result of the chemical union between two or more elements in fixed weight ratios**

Example (**mercury oxide - water**)

A method of chemically separating compounds

1- Heating:

- When heated red mercury oxide dissolves into elements (mercury and oxygen gas).

2-Electrolysis:-

- Water can be analyzed into the basic elements, which are oxygen gas and hydrogen gas. When sulfuric acid (hydrocarbon acid) is added and the Voltar-Hoffman device is used, When water is electrolyzed, hydrogen gas is released at the negative electrode and oxygen is released at the positive electrode

Give a reason >>>

1- Hydrogen is classified as an element?

Because it cannot be analyzed into something simpler by chemical or physical methods.

2- Water is classified as the compound?

Because its components, oxygen and hydrogen, can be separated by electrolysis

Compound molecule :-

The compound molecule is composed of **different atoms** of the elements, unlike the element molecule, which is composed of identical atoms. The compound molecule can be expressed in the molecular formula

Molecular formula:-

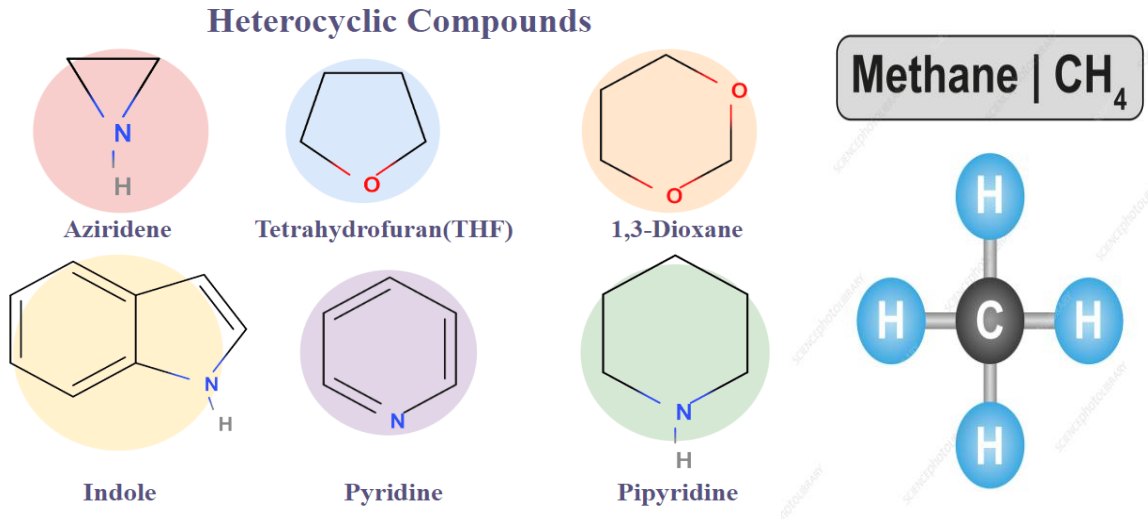
A symbolic formula that expresses the type and number of atoms of the elements that make up the molecule

Compounds are classified into:

1- Organic compounds:

Compounds in which carbon atoms are bonded to hydrogen atoms and may be bonded to other atoms such as oxygen or nitrogen

Example: methane molecule



The number of atoms in one molecule of organic compounds may reach several thousand atoms, such as (plastic polymers), (blood hemoglobin), (vitamin D).

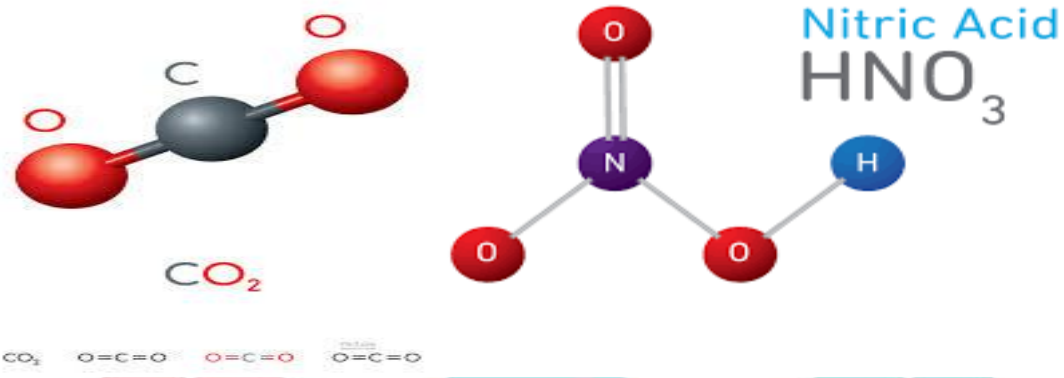
Give a reason: Organic compounds are known as carbon compounds?

Because the carbon element is mainly included in its composition

2- Inorganic compounds:

Compounds containing **multiple elements, which may include carbon**

Such as **nitric acid,carbon dioxide**



Exercises : Write true or false for the statements:

1- Substances are classified into mixtures and pure substances

2- Mixtures cannot be separated by physical methods

3- Filtration can be used to separate salt dissolved in water

4- Magnetic separation is one of the chemical separation methods

5- Heterogeneous mixtures whose components can be seen with the naked eye

6- Filtration is a physical method for separating dissolved components in water

7- Dissolved salt in water can be separated through the process of condensation and evaporation

8- A compound is the simplest pure form of matter

9- A pure substance, such as a compound or element, can be separated by physical methods

10- The oxygen molecule is a diatomic molecule

11- A compound is a substance produced from the chemical union of element atoms

12- Electrolysis can be used to separate the components of the mercury oxide compound

13- Organic compounds consist mainly of oxygen

14- We can consider hydrogen as an element

15- Water can be classified as a compound