

Kinds (types) of molecules أنواع الجزيئات

1- Element molecule

2- Compound molecule

جزيء العنصر ذراته متشابهة - جزيء المركب ذراته مختلفة

The molecules are composed of tiny particles -units- are called atoms.

الجزيء يتكون من ذرات

جزيء العنصر : أبسط جزء من المادة لا يمكن تحليله

Element molecule is the simplest pure form of matter, can't analyzed it into simple form.

جزيء الاكسجين يتكون من ذرتين متشابهة من الاكسجين

Molecules of **Element** have **similar** atoms.



Oxygen molecule (O₂)

The molecule of oxygen consists of 2 oxygen atoms

جزيء العنصر يتكون من ذرة واحدة يسمى monoatomic - او ذرتين يسمى diatomic

Molecules of elements

1. Monoatomic elements which molecules composed of one atom:

Inert gases (Noble gases)

Helium He - Neon Ne - Argon Ar - Krypton Kr

Xenon Xe - Radon Rn

Liquid element: Mercury Hg

2. Diatomic elements which molecules composed of two atoms:

Active gases

Hydrogen H₂ - Nitrogen N₂ - Chlorine Cl₂ - Fluorine F₂ - Oxygen O₂

Liquid element: Bromine Br₂

عناصر سائلة Liquid elements

one atom - monoatomic

Mercury Hg

two atoms - diatomic

Bromine Br₂

Gases elements

one atom - monoatomic

Noble gases

two atoms - diatomic

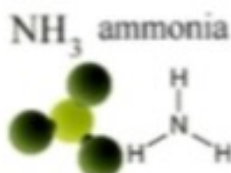
Active gases

Molecules of Compound جزئ المركب

Molecules of Compound have different atoms.

جزئ المركب : عبارة عن اتحاد عناصر او ذرات مختلفة بنسب ثابتة مثل الماء والامونيا وكلوريد الهيدروجين

Compound molecule: Is the product of a combination of 2 or more different elements with constant weight ratios.



جزئ الماء : يتكون من ذرتين هيدروجين وذرة اكسجين - جزئ كلوريد الهيدروجين (ذرة هيدروجين+ذرة كلور)
الامونيا (التشادر) : 3 ذرات هيدروجين وذرة نيتروجين

Examples:

1. The molecule of **water** consists of two **hydrogen** atoms & one **oxygen** atom.
2. The molecule of **hydrogen chloride** consists of one **hydrogen** atom & one **chlorine** atom
3. The molecule of **ammonia** consists of one **nitrogen** atom & three **hydrogen** atoms.

Name	Similar or different	Element	compound
1) Oxygen molecule O ₂	similar	element	
2) Water molecule H ₂ O			
3) Hydrogen Chloride			
4) Ammonia molecule NH ₃	different		compound

Elements & Compounds

	Element	Compound
Definition	Is the simplest pure form of matter, can't analyzed it into simple form.	Is the product of a combination of 2 or more different elements with constant weight ratios.
Atoms	similar	different
	Ex. Oxygen - hydrogen	Ex. Water - Co ₂ - ammonia - Hydrogen chloride

L2 Matter & its construction تركيب المادة

The building unit of living organisms is the **Cell**.

The building unit of matter is the **Molecule** & each molecule consists of **atoms**.

الخلية وحدة بناء الاكسار - الجزئ وحدة بناء المادة ويتكون من ذرات

What is a molecule?

Matter is composed of molecules

لمعرفة ان المادة تتكون من جزيئات - نفتح زجاجة البرفان رائحتها تنتشر لانه يتكون من جزيئات molecules

What happens when and give reason ?

You open a bottle of perfume for a period of time

Answer you smell it all over the room

Bec. The perfume consists of **Molecules** which spread and carry the smell

الجزئ : اصغر جزء في المادة يوجد منفردا ويحمل خصائص المادة (الرائحة)

Molecule:

Is the smallest part of matter which can exist freely & it has matter properties.

خصائص الجزيئات : حركة مستمرة - وجود مسافات بينية - وجود قوى تجاذب

Properties of molecules:

- 1- Molecules of matter are in **continuous motion**
- 2- There are **intermolecular spaces** among molecules
- 3- There are **intermolecular forces** among molecules

1. Motion of molecule

وضع نقطة حبر في الماء تنتشر لان الجزيئات في حركة مستمرة

What happens when and give reason

You put a small amount of potassium permanganate (ink) in a glass of water.

Answer The color spreads through the water.

B. The molecules are in a state of continuous motion.

G.R when open perfume bottle, you smell it all over the room

Bec. The molecules are in continuous motion.

2. Intermolecular spaces among molecules.

They are spaces among the molecules of matter

عند اضافة 200 سم³ ماء الى 300 سم³ كحول نجد الحجم اقل من 500 سم³ دليل وجود مسافات بين الجزيئات

What happens when and give reason

You add 200 cm³ of alcohol to 300 cm³ of water in a measuring cylinder.

Answer The volume of the mixture is less than 500 cm³

Bec. alcohol molecules inter in the intermolecular spaces between water molecules

3. The intermolecular force between the molecules of matter

They are forces among – bind- the molecules of matter

لا نستطيع كسر الحديد ولكن نستطيع تجزئة كمية من الماء – لوجود قوى تجاذب قوية في المواد الصلبة عن السائلة

What happens when and give reason?

1. You try to break an iron piece into smaller parts.
2. You try to divide an amount of water on small cups.

Answer You can't break the iron but you can separate the water easily.

B. The intermolecular forces between the molecules are very **strong in solids**, and **weak** in liquids.

The states of matter

Comparison between solids, liquid & gas.

	Solid	Liquid	Gas
Motion of ^{الحركة} molecules	Limited محدودة	More free	Completely free
Intermolecular space ^{المسافات}	Very small	large	Very large
Intermolecular force	Very strong	Weak	Very weak
Shape ^{الشكل}	Definite ثابت	Indefinite	Indefinite
Volume ^{الحجم}	Definite	Definite	Indefinite
Examples	Iron & Aluminum	Alcohol & Water	Oxygen & Carbon dioxide

Give reason: Solids have definite shape & volume.

* *Because the intermolecular forces are very strong.*

المواد الصلبة لها شكل وحجم ثابت – محدد لان قوى التجاذب بين الجزيئات قوية جدا

The change of matter states

Melting: it is change of matter from solid to liquid state by heating

الانصهار : تحول المادة من الحالة الصلبة الى السائلة بالتسخين

تفسير الانصهار : جزيئات المادة الصلبة تكتسب حرارة تزداد سرعتها فتبتعد عن بعضها فتزيد المسافة وتقل قوى التجاذب متحوّلة الى سائل

*** Explanation of melting:**

Give reasons:

Heat changes the matter from solid state into liquid state.

1. Bec. When heated its molecules gains energy, its speed increases

* The intermolecular spaces **increase**.

* The intermolecular forces **weak**.

التبخّر : تحول المادة من الحالة السائلة الى الغازية بالتسخين

تفسير التبخّر : جزيئات المادة السائلة تكتسب حرارة تزداد سرعتها فتبتعد عن بعضها فتزيد المسافة وتقل جدا قوى التجاذب متحوّلة الى بخار

vaporization: it is change of matter from liquid to gaseous state by heating

*** Explanation of evaporation:**

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Give reasons:

Heat changes the matter from liquid state into gaseous state.

1. Bec. When heated its molecules gains energy, its speed increases

* The intermolecular space **increases**.

* The intermolecular forces **very weak**.