



# CHEMISTRY 10.8&9

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QENA STUDENT CLUB

# DEFINITIONS

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**Solute:** Substance solved by another substance.

**Solvent:** Substance that dissolves the other substance.

**Solution:** It's a homogeneous mixture of two or more substances. Ex: Salt & Water

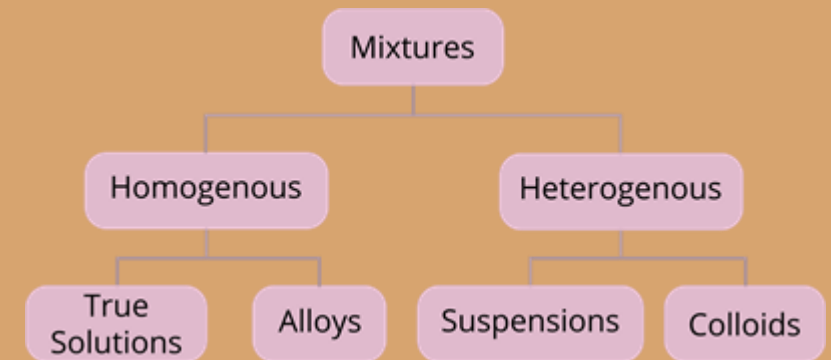
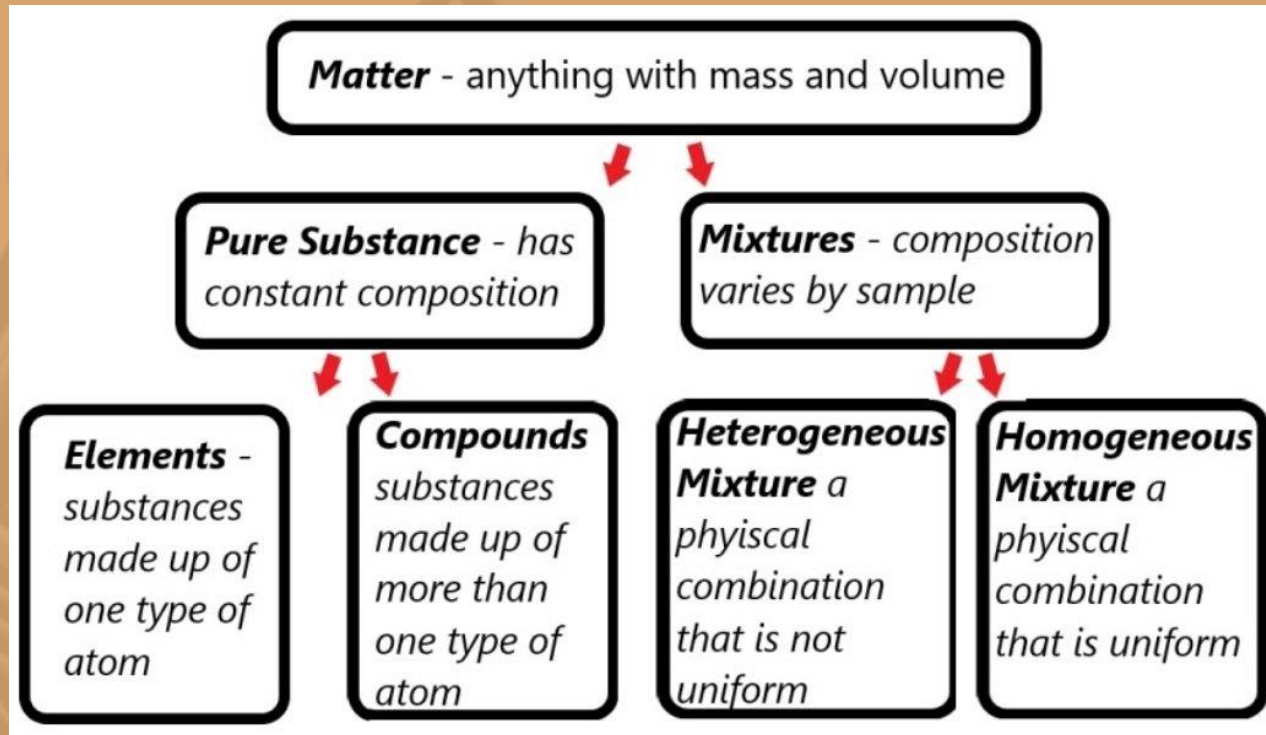
**Concentration:** It is the concentration of a solution in proportion to solute compared with solvent.

**Solubility:** Maximum amount of solute which can be dissolved in each amount of a solvent at a given temperature and pressure.

**Saturated solution:** A solution where no more solute can be dissolved at a given temperature and pressure.

**Miscible:** It is the mixture of two liquids to form a solution

# MATTER CLASSIFICATION



# PROPERTIES OF MIXTURES

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- **They don't have any specific properties.**
- **Their melting and boiling points differ.**
- **They are formed because of physical change.**
- **They have a variable composition.**
- **The individual substances in a mixture maintain their chemical properties.**
- **The substances in a mixture can be separated by physical means such as filtration, distillation, or centrifugation.**
- **The proportion of substances in a mixture can vary without changing the nature of the mixture.**
- **Mixing substances do not involve a chemical reaction, and no new substances are formed.**

**Homogeneous mixtures have a uniform composition throughout, like salt dissolved in water.**

**Heterogeneous mixtures have a non-uniform composition, like sand mixed with salt.**

# TYPES OF SOLUTIONS

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## **🔔 Some common types of solutions:**

- **Solid Solutions:** Both solute and solvent are in the solid state, e.g., alloys like brass
- **Liquid Solutions:** The solute can be a gas, liquid, or solid that is dissolved in a liquid solvent, e.g., salt water.
- **Gaseous Solutions:** Typically, homogenous mixtures of gases, e.g., air.

## **🔔 Depending on the concentration of solute, solutions can be:**

- **Dilute:** A small amount of solute in a large amount of solvent.
- **Concentrated:** A large amount of solute in a small amount of solvent.
- **Saturated:** Contains the maximum amount of solute that can dissolve at a given temperature.
- **Unsaturated:** More solute can be dissolved at the current temperature.
- **Supersaturated:** Contains more solute than can remain in solution at a given temperature and can crystallize out.

# EXAMPLES OF SOLUTIONS

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🔔 **Liquid-liquid solution: isopropyl**

**Ex. alcohol + water = rubbing alcohol & Propylene glycol + water = antifreeze**

🔔 **Liquid – solid solution:**

**Ex. Hydrated salts, mercury in amalgamated zinc, etc.**

🔔 **Liquid – gas solution: Aerosol**

**Ex. water vapour in the air.**

🔔 **Gas – solid: Ex. Hydrogen absorbed in palladium.**

🔔 **Gas – gas: Ex. air.**

🔔 **Gas - liquid solution:**

**Ex. carbon dioxide + water = seltzer & Ammonia + water = cleaning solution**

🔔 **Solid – liquid: The solution of**

**Ex. sugar, salt etc. in water.**

🔔 **Solid – gas: Sublimation of substances like iodine, camphor etc into the air.**

🔔 **Solid – solid: Alloys**

**Ex. Copper + tin = bronze, Iron + carbon + other metals = steel**

# PREPARATION OF COLLOIDS

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**📌 Dispersion Methods:** These involve breaking down larger particles into colloidal dimensions.

- **Milling**
- **Spraying**
- **Application of shear (e.g., shaking, mixing, or high shear mixing)**

**📌 Condensation Methods:** These involve growing smaller molecules into larger colloidal particles. Common techniques are:

- **Precipitation**
- **Condensation**
- **Redox reactions**

**Specific methods for preparing colloids include:**

**📌 Chemical Methods:**

- **Double Decomposition:** For example, passing hydrogen sulfide through a solution of arsenious oxide to form a colloidal solution of arsenious sulfide.
- **Oxidation:** For instance, creating a colloidal solution of sulfur by passing sulfur dioxide through an aqueous solution.
- **Reduction:** Such as using a reducing agent like stannous chloride to prepare colloidal solutions of metals.



# EXAMPLE OF COLLOIDS



## 🔔 NOTE:

Colloid type	Dispersing substance	Dispersing medium	Examples
Aerosol	Liquid	Gas	Fog, aerosol sprays
Aerosol	Solid	Gas	Smoke, airborne bacteria
Foam	Gas	liquid	Whipped cream, soap suds
Emulsion	Liquid	liquid	Milk, mayonnaise
sol	Solid	solid	Paint, clays, gelatin
Solid foam	Gas	solid	Marshmallow, polystyrene foam
Solid emulsion	Liquid	solid	Butter, cheese
Solid sol	Solid	solid	Ruby glass

Dispersing substance	Dispersing medium	Colloid type
gas	gas	Not colloid.
solid	solid	Not colloid.



# TEST BANK

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**1) What are the two types of pure substances**

- a) Elements and Subatomic Particles**
- b) Protons and Electrons**
- c) Atoms and Compounds**
- d) Homogenous and Heterogeneous**

**answer: C**

**2) What are the two types of Mixtures**

- a) Elements and Subatomic Particles**
- b) Protons and Electrons**
- c) Atoms and Compounds**
- d) Homogenous and Heterogeneous**

**answer : D**

**3) One specific type of homogeneous mixture is**

- a) An atom**
- b) An element.**
- c) A solution**
- d) A compound**

**Answer: C**

**4) Cookies and cream ice cream would be classified as**

- a) A homogenous mixture**
- b) A heterogenous mixture**
- c) An element**
- d) A compound**

**Answer : B**

**5) Table salt, also known as sodium chloride would be classified as**

- a) A homogeneous mixture**
- b) A heterogeneous mixture**
- C) An element**
- D)A compound**

**Answer : D**





**6. A glass of Kool Aid would be classified as**

- a) A homogeneous mixture**
- b) A heterogeneous mixture**
- c) An element**
- d) A compound**

**Answer : A**

**7) Helium would be classified as**

- a) A homogeneous mixture**
- b) A heterogeneous mixture**
- c) An element**
- d) A compound**

**answer C**

**8) The prefix homo- means**

- a) Same**
- b) Different**
- c) Whole**
- d) Bonded**

**answer : A**



**9) Two elements chemically combined defines**

- a) A homogeneous mixture.**
- b) A heterogeneous mixture**
- c) An element**
- d) A compound**

**answer : D**

**10) Two substances physically combined and that appears the same throughout is classified as:**

- a) A homogeneous mixture**
- b) A heterogeneous mixture.**
- c) An element**
- d) A compound**

**answer: A**

**11. Type of matter?**

- a) Pure substance**
- b) Heterogeneous mixture**
- c) Homogeneous mixture**
- d) All the previous**

**answer : D**



**12. Between which two of the following will a solution form?**

- A)Mercury and gold**
- B)Gold and water**
- C)Water and methane**
- D)Methane and silver**

**Answer: A**

**13. Between which of the following phases can a solution not form?**

- A)Solid and solid**
- B)Gas and liquid**
- C)Gas and solid**
- D)None of the above**

**Answer: D**

**14. Which of the following observations indicates that the mixture you possess is not a solution?**

- A) It is colored.**
- B) It has a taste different than the solvent.**
- C) It is opaque due to the presence of barely visible particles.**
- D) It conducts electricity.**

**Answer: C**

# TYPES OF PHYSICAL PROPERTIES

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## THE TEXTURE:

- **The texture is defined as the feel or appearance of a surface or substance.**
- **Texture: the characteristics of the surface of a material, like how smooth, rough, or coarse it is**
- **Example: rough, hard, liquid, solid, wet, bumpy, fuzzy, sticky, dusty, sharp, gritty, soft, lumpy.**

## UNIFORMITY

- **Uniformity is the property of how describes how consistent a material is throughout as it shows how the matter is cohesive**
- **Related to the sequence of molecules and its distribution.**

## BOUNCE

- **Bounce refers to the material's ability to return to its original position when it is dropped from a given height. Another way to about bounce is to consider how much it behaves like a ball thing**
- **Simply it is the ability of an object to rebound to its original position when dropped from a given height**



## STRENGTH

Strength is the property that determines how durable the material is. How strong it is, When the Force acts on the matter and is more than the Ultimate Strength the Matter will break down.

Solids have high strength, specifically which have high modulus.

The strength of the solution is defined as the amount of solute in grams that is present in a one-liter solution.

Many quantities represent the strength of the solution which is normality, molarity, and molality

## ELASTICITY

Elasticity is the property of a material to resist deformation and return to its normal size or shape after a force has been applied to it.

When Force acts on the matter with more than the yield point, it will be permanent deformation (plastic deformation)

<b>ELASTIC DEFORMATION VERSUS PLASTIC DEFORMATION</b>	
Elastic deformation is the deformation that disappears upon the removal of the external forces, causing the alteration and the stress associated with it	Plastic deformation is the permanent deformation or change in shape of a solid body without fracture under the action of a sustained force
Reversible	Irreversible
Non-permanent; the substance can resume the initial state back	Permanent; the substance stays unchanged after removing the stress
Causes the chemical bonds of the substance to undergo stretching and bending	Cause some of the chemical bonds of the substance to undergo breakage
Atoms do not slip pass on each other	Atoms slip pass on each other





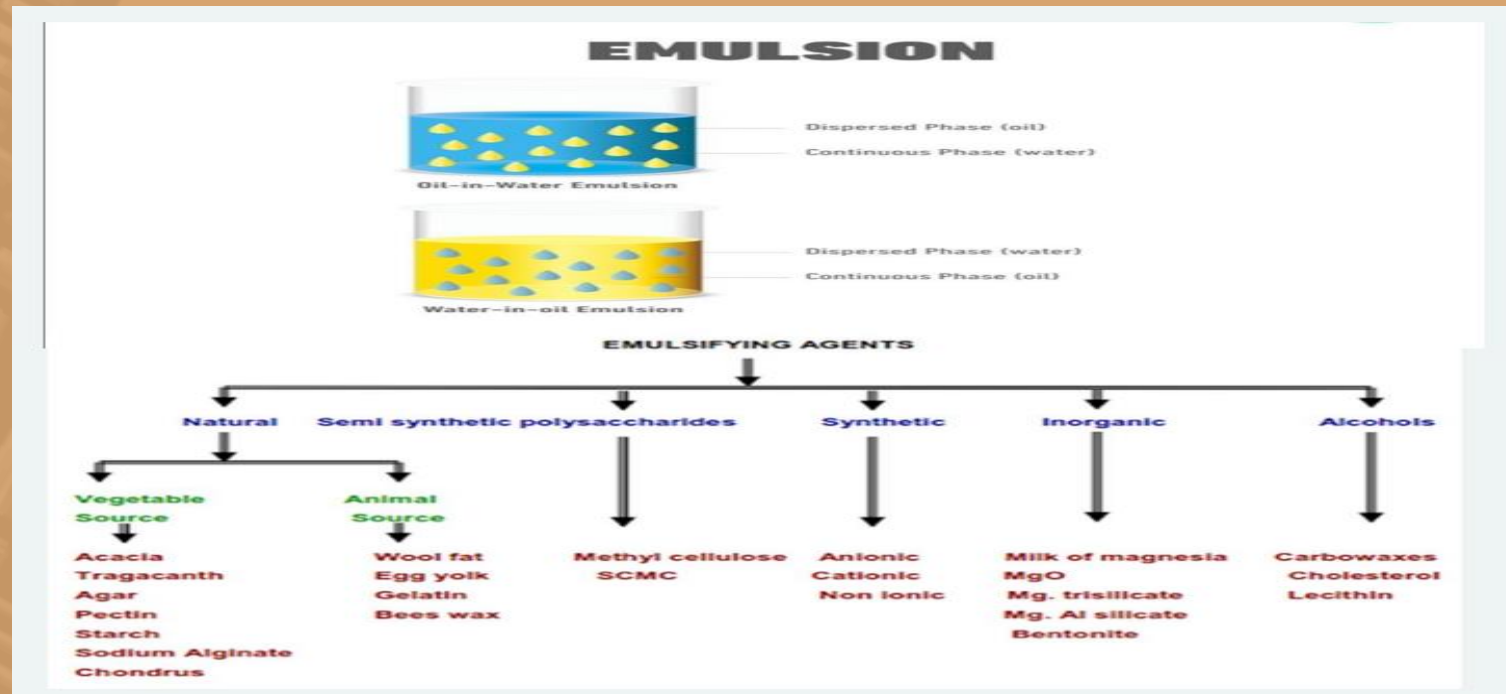
## THE EMULSION

It is a colloid or colloidal dispersion of one liquid suspended in another or in other words adds to liquids that are immiscible for an example oil add to water, they don't mix with each other since they are immiscible.

The emulsion is Latin word meaning “to milk”

(Milk is one example of an emulsion of fat and water)

An emulsion is a type of colloid but not all colloids are emulsions.





**THANKS**

**MADE BY:**

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