

### VOCABULARY UNIT 3: PURE SUBSTANCES AND MIXTURES 2º ESO

<u>ENGLISH</u>	<u>SPANISH</u>
Alloy	Aleación
Atom	Átomo
Bunsen burner	Mechero Bunsen
Clock glass	Vidrio de reloj
Condenser	Tubo refrigerante
Container	Recipiente
Compound	Compuesto
Crystallisation	Cristalización
Decantation	Decantación
Dissolution	Disolución
Distillation	Destilación
Distillation flask	Matraz de destilación
Electrolysis	Electrólisis
Element	Element
Evaporating dish	Plato evaporizador
Filtration	Filtración
Frame	Estructura, armazón
Funnel	Embudo
Filter paper	Papel de filtro
Heterogeneous mixture	Mezcla heterogénea
Homogeneous mixture	Mezcla homogénea
Insoluble	Insoluble
Layer	Capa
Magnetic separation	Separación magnética
Mixture	Mezcla

Pressure	Presión
Pure substance	Sustancia pura
Residue	Residuo
Separating funnel	Embudo de decantación
Simple substance	Sustancia simple
Soluble	Soluble
Solute	Soluto
Solution	Disolución
Solvent	Disolvente
Structure	Estructura
Test tube	Tubo de ensayo
To bang	Golpear
To collect	Recoger
To decompose	Descomponerse
To dissolve	Disolver
To distribute	Distribuir
To float	Flotar
To heat	Calentar
To identify	Identificar
To integrate	Integrar, formar
To pull away	Soltarse, arrancar
To remain	Permanecer, continuar
To shake	Agitar, sacudir
To surround	Rodear
To transfer	Transferir, traspasar
Tripod	Trípode
Wire gauze	Rejilla

## UNIT 3: PURE SUBSTANCES AND MIXTURES

### CHARACTERISTIC PROPERTIES

A characteristic property is a physical or chemical property that we can use to identify a substance. Density, melting point and boiling point are characteristic properties.

### CLASSIFICATION OF MATTER

We can classify matter, in two categories: *pure substances and mixtures*.

**Pure substance**: only one substance, its characteristic properties do not change, in the same conditions of temperature and pressure.

**Mixture**: two or more substances, its characteristic properties change, depending on the type of substances is formed by and on the amount of each substance.

### TYPES OF PURE SUBSTANCES

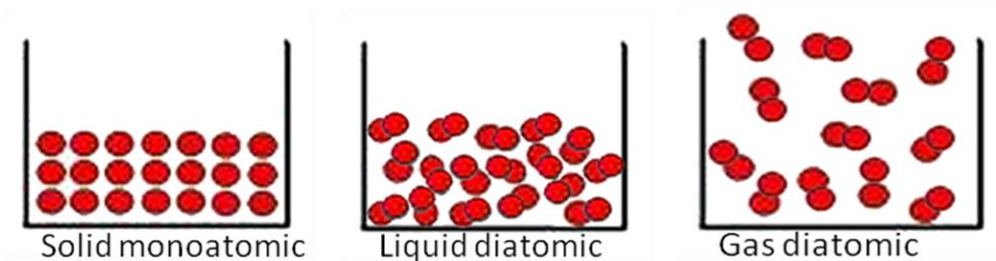
There are two types of pure substances: *simple substances and compounds*. We can differentiate them, watching their behavior when exposed to heat or electricity.

***Simple substances*** are those which do not decompose into simpler pure substances by means of heating or electrolysis.

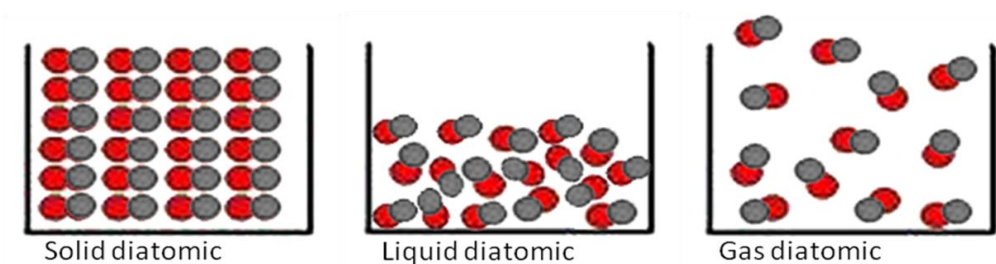
***Compounds*** are those substances that decompose into simpler pure substances by means of heating or electrolysis.

From the point of view of their structure, the pure substances have only one type of molecules.

***Simple substances*** have equal molecules with only one type of atoms.



***Compounds*** have equal molecules with two or more types of atoms.

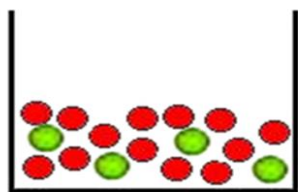


## TYPES OF MIXTURES

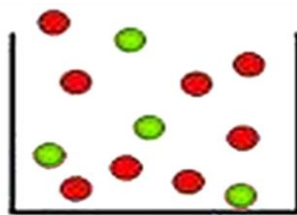
**Homogeneous:** mixtures which have the same properties throughout the mixture. We can call this type of mixture, dissolution or solution.



Solid dissolution

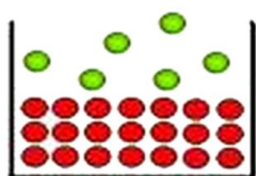


Liquid dissolution

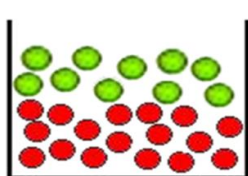


Gaseous dissolution

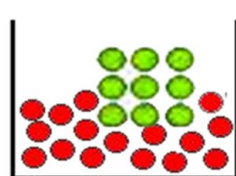
**Heterogeneous:** mixtures which have different properties throughout the mixture.



Heterogeneous mixture of one solid and one gas



Heterogeneous mixture of two liquids



Heterogeneous mixture of one solid and one liquid

**A1.** Indicate which of the following properties are characteristic and which are extensive or intensive: mass, volume, density, colour, boiling point, length, hardness, melting point, smell, temperature, ductility and brightness.

**A2.** Connect the terms of the two columns.

- |                                     |                    |
|-------------------------------------|--------------------|
| 1. Pure substance                   | A. Granite         |
| 2. Heterogeneous rock               | B. Water           |
| 3. Solution                         | C. Gold            |
| 4. Liquid metal to room temperature | D. Salt with water |
| 5. Solid metal to room temperature  | E. Water           |

**A3.** Is the water that we drink an absolutely pure substance?

- A. No, because it is a heterogeneous substance
- B. It is not pure, it has mineral salts dissolved
- C. Otherwise, we cannot drink it
- D. Of course, it is distilled water

**A4.** Classify the following products as: simple substance, compound, dissolution or mix heterogeneous.

<b>PRODUCTS</b>	<b>SIMPLE SUBSTANCE, COMPOUND, DISSOLUTION OR MIX HETEROGENEOUS</b>
<b>Wine</b>	
<b>Vinegar</b>	
<b>Soft drink</b>	
<b>Gasoline</b>	
<b>Alcohol 96 %</b>	
<b>Marmalade</b>	
<b>Milk</b>	
<b>Bleach</b>	
<b>Bread</b>	
<b>Blood</b>	
<b>Oil</b>	
<b>Iron</b>	
<b>Drinkable water</b>	

**A5.** Is the air a pure substance?

- A.** No, the air is a gas mixture.
- B.** Yes, because it is a gas.
- C.** No, because a simple gas form it.
- D.** Yes, for that reason we can breathe it.

A6. What is the rock called “granite”?

1. A pure substance and heterogeneous
2. A homogeneous rock
3. A pure substance
4. A heterogeneous solid mixture

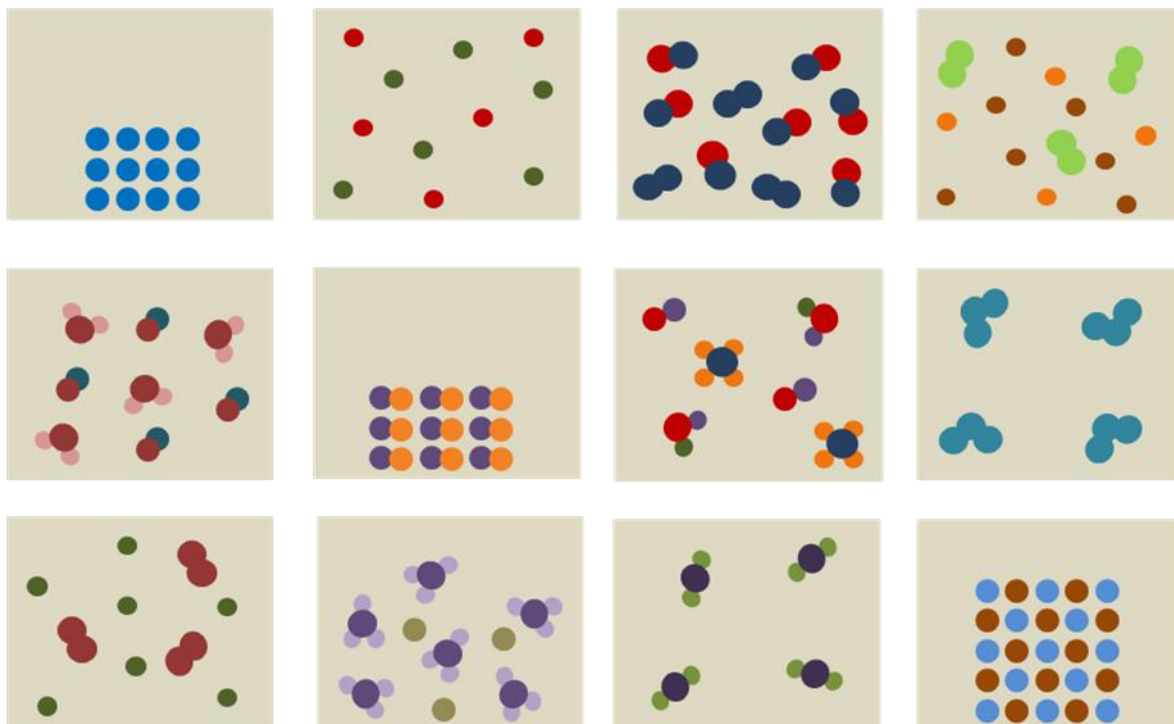
A7. Classify the following systems as: simple substance, compound substance, homogeneous mixtures or heterogeneous mixtures.

SYSTEM A
SYSTEM B
SYSTEM C
SYSTEM D

A8. Choose the correct letters in the boxes on the right.

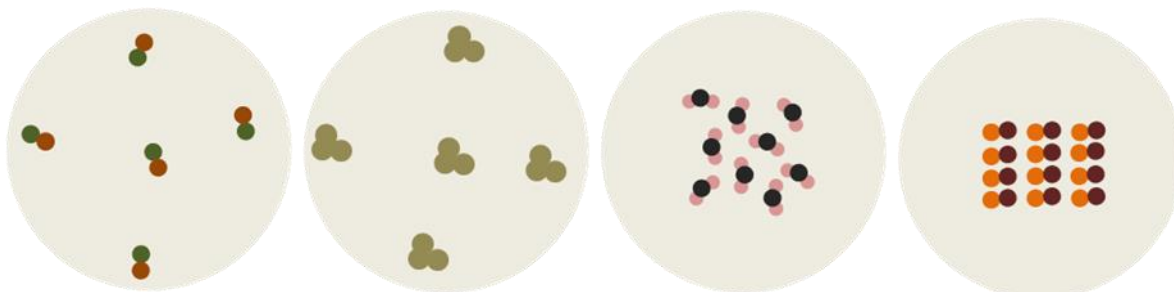
Mixture of two simple substances	
A simple substance with diatomic molecules	
Mixture of three simple substances	
One compound substance	
One simple substance	
Mixture of two compounds	
A simple substance with monoatomic molecules	

**A9.** Classify the following diagrams as: simple substance, compound, mixture of simple substances, mixture of compounds, mixture of simple substances and compounds.



**A10.** Which of the following diagrams represent?

1. The compound CO (gas)
2. The simple substance O<sub>3</sub> (gas)
3. The compound H<sub>2</sub>O (liquid)
4. The compound NaCl (solid)



**A11.** What do you remember? Separating components of a homogeneous mixtures. Join with arrows.

- |                              |  |
|------------------------------|--|
| <b>A.</b> By distillation    | <b>1.</b> Salt and sea water in the salt mines |
| <b>B.</b> By crystallization | <b>2.</b> Alcohol and water                    |
| <b>C.</b> By heating         | <b>3.</b> Copper sulphate and water            |

**A12.** What do you remember? Separating components of a homogeneous mixtures. Join with arrows.

- |                         |                                   |
|-------------------------|-----------------------------------|
| <b>A.</b> By magnetism  | <b>1.</b> Sand and water          |
| <b>B.</b> By filtration | <b>2.</b> Oil and water           |
| <b>C.</b> By decanting  | <b>3.</b> Sand and iron particles |

**A13.** Can we decompose a pure substance in others by means of physical procedures?

- A.** No, we cannot
- B.** Yes, filtering it
- C.** Yes, by means of distillation
- D.** Clear that yes

**A14.** Complete the sentences. Use the words in the box.

<b>filtration, heating, decantation, distillation</b>
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- A.** ..... is good for separating a liquid from a solution.
- B.** ..... is good for separating a soluble solid from a liquid.
- C.** ..... is good for separating an insoluble solid from a liquid.
- D.** ..... is good for separating two immiscible liquids.

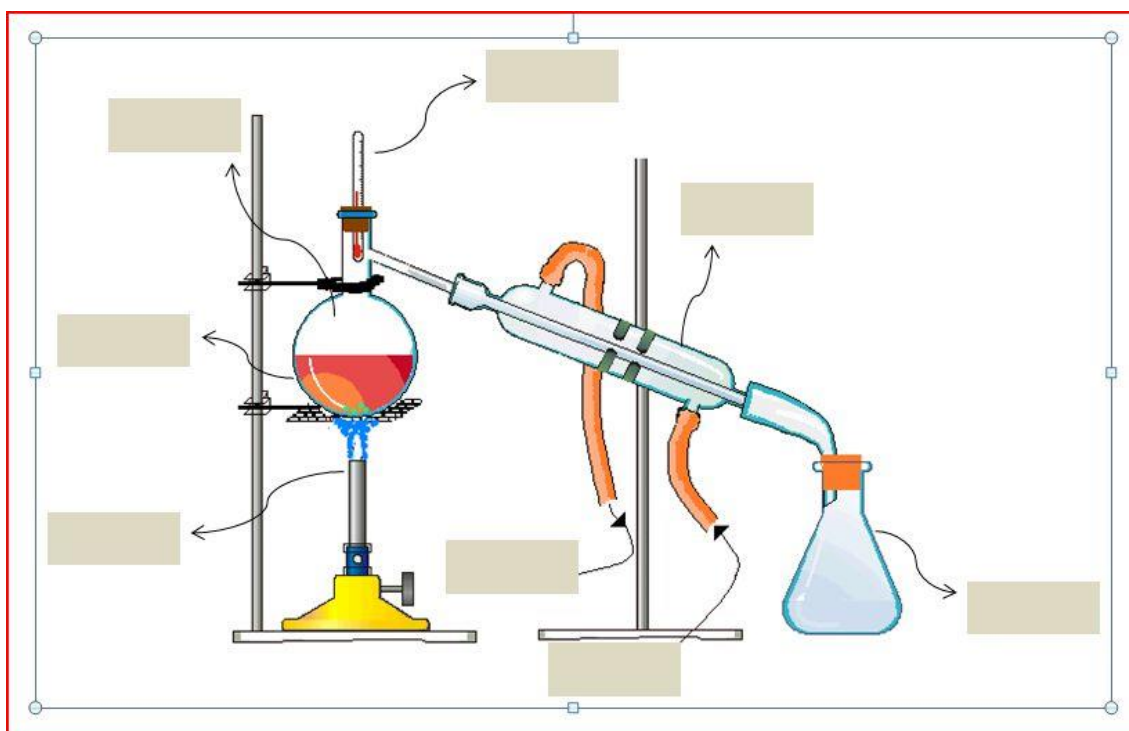


**A15.** Each verb in the table represents a separation process. Write down the corresponding noun.

<b>VERB</b>	<b>Evaporate</b>	<b>Distil</b>	<b>Filter</b>	<b>Crystallise</b>
<b>NOUN</b>				

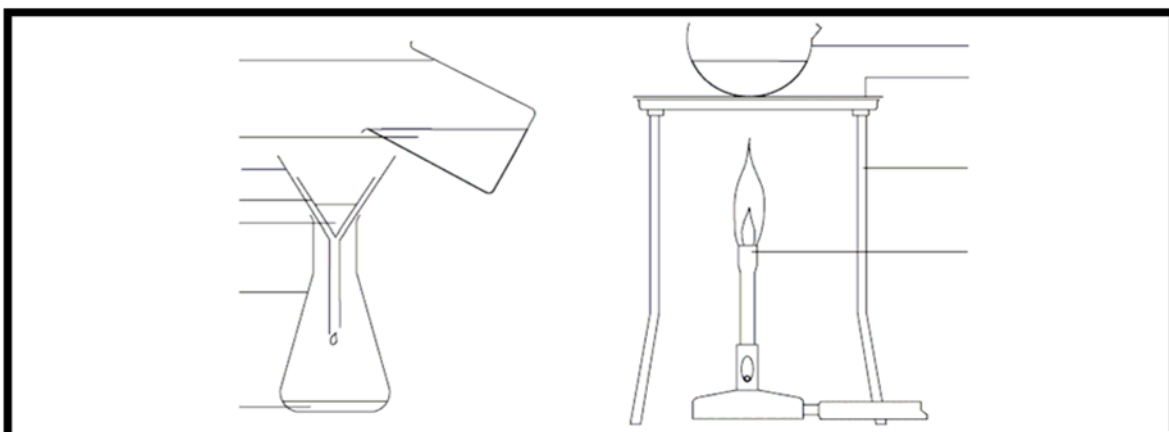
**A16.** Distillation is the separation of a liquid from a solution by boiling and condensing. Use words from the box to label the diagram:

**Thermometer, Cold water out, Vapour, Distillate, Solution, Heat, Cold water in, Condenser**



**A17.** We can heat to separate soluble solids from solutions and we filter to separate insoluble solids from liquids. Use words from the box to label the diagram:

**Salt solution, Filter funnel, Filter paper, Sand, Conical flask, Salt solution, Beaker, Evaporating dish, Gauze, Tripod, Bunsen burner**



**A18.** Connect the terms of the two columns

- A.** How can you separate oil from water?
- B.** How can you separate a mixture of alcohol and water?
- C.** How can you obtain salt from sea water?
- D.** How can you separate a mixture of sand and stones?
- E.** How can you separate a mixture of sulfur and iron filings?

- 1.** With a magnet
- 2.** With a separating funnel
- 3.** With a sieve
- 4.** Heating until water vaporizes
- 5.** Distilling

**A19.** We add a small amount of a solid substance to a glass with water. After a while, the solid substance disappears and the water is of pink colour.

- A.** What is this process called? What tests can you do to verify it?
- B.** Indicate which the solute is and which the solvent is.
- C.** Make a drawing of how you imagine the molecules of the solid substance and water are, before and later.
- D.** What changes occur in the molecules of the solid substance when it disappears in the water?
- E.** Why does all the water change colour, although you do not shake with a teaspoon, and not only the part nearest where you put the solid?

- F. A classmate says that the water colours because the molecules of the solid are of pink colour and they mix with those of water that do not have colour. Do you agree? Justify your answer.
- G. A classmate says that if you want to return the water to its original transparent state, you can filter the mixture. Do you agree? Explain your answer.
- H. A classmate says that the pink solid is not the one that you think but another that has the same colour. How can you prove it?

**A20.** Revise your vocabulary. Choose a word and fill the blanks below.

**compounds, simple, heterogeneous, atoms, pure substances , decantation, homogeneous, identify, mixtures, distillation, mixtures, physical, pure, crystallisation, change, depending, types, decompose, heating, electrolysis, filtration, dryness, substances, atoms, molecules, compounds, molecules**

- A. A characteristic property is a ..... or chemical property that we can use to ..... a substance.
- B. We can classify matter, in two categories: ..... and .....
- C. .... substances are those which characteristic properties do not ....., in the same conditions of temperature and pressure.
- D. In the ....., the characteristic properties change, ..... on the type of substances form it and on the amount of each substance.
- E. There are two ..... of pure substances: simple substances and .....
- F. .... substances are those which do not ..... into simpler pure substances by means of ..... or .....
- G. Simple ..... have equal ..... with only one type of .....
- H. .... have equal ..... with two or more types of .....
- I. There are two types of mixtures: ..... and .....
- J. The main techniques of separation of heterogeneous mixtures are: the ....., the ..... and the magnetic separation.
- K. The main techniques of separation of homogeneous mixtures are: the heating until ....., the ..... and the .....