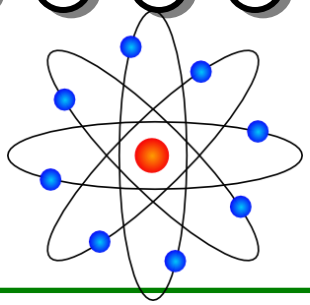
TOPIC 4: PURE SUBSTANCES AND MIXTURES

Full name: .....
Date: .....
Class: .....
School: .....
Teacher: .....

Contents:

1.-Pure substances
  1.1 simple substances.
  1.2 compounds
2.- Mixtures
  2.1 Homogeneous
  2.2 Heterogeneous
3.- Techniques for the separation of mixtures.
4.- Classification and characteristics of pure substances.

vocabulary



A
-atom: átomo
B
-because: porque
-Boiling point: punto de ebullición
-by: por, mediante
C
-cannot: no puede
-carbon dioxide: dióxido de carbono
-change: cambiar
-chemical: químico
-compound: compuesto
-contain: contener
-copper: cobre
-cristallisation: cristalización

D
-decantating: decantación
-density: densidad
-depend on: depende de
-distinguish: distinguir
-Distillation: destilación

E
-each: cada
-equal: igual
F
-filtration: filtración

G
-gas: gas
-glucose: glucosa
-gold: oro

H
-heat: calor
-heating to dryness: secado con calor
-homogeneous: homogéneo
-heterogeneous: hetereogéneo
how: como

I
-Identify: identificar
-if: si

K
-kind: tipo, clase

L
-Layer: capa
-Liquid: líquido

M
-Magnetic separation: imantación
-Mass: masa
-Matter: materia
-means: medio
-melting point: punto de fusión
-mercury: mercurio
-mixture: mezcla
-molecule: molécula

O
-other: otros

P
-pressure: presión

R

S
-salt: sal
-same: mismo
-separate: separar
-separated: separado
-sifting:tamización
-solid: sólido
-substances: sustancias
-sugar: azúcar
-sulphur: sulfuro

T

U

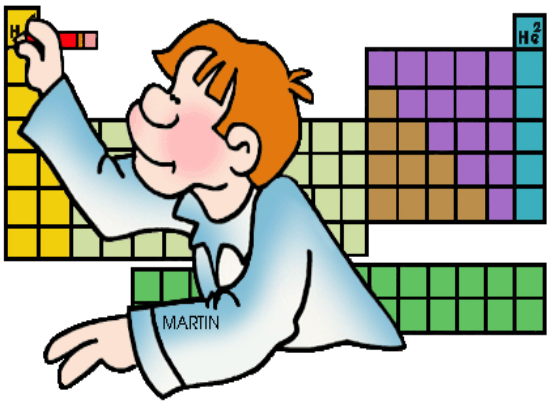
V
-volume: volumen

0.- INTRODUCTION

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

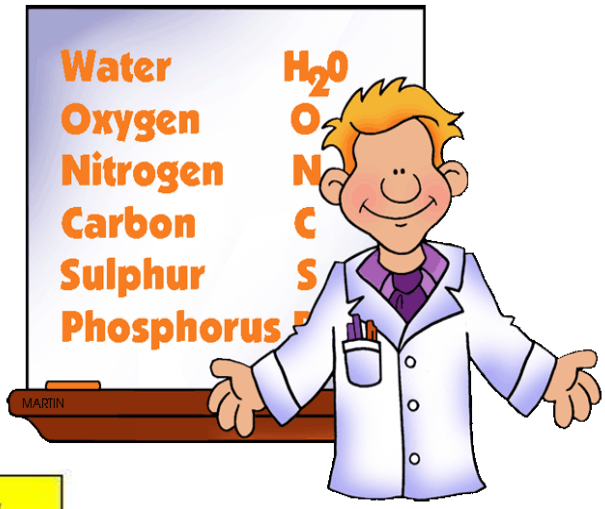
1.- PURE SUBSTANCES

Their properties don't change in the same conditions of pressure and temperature. They cannot be separated by physical means.



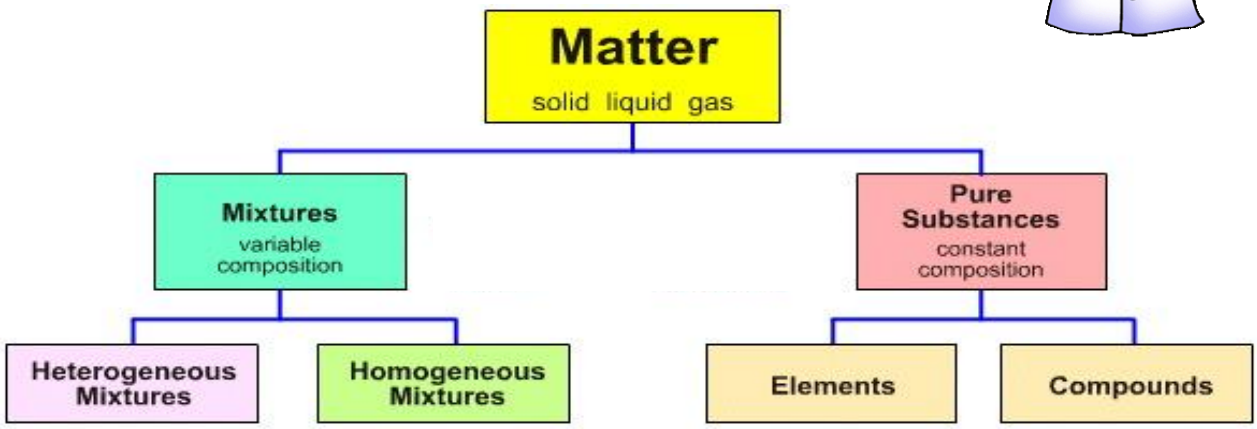
1.1.-Simple substances or elements

They have got the same types of atoms. Gold, mercury and sulphur are simple substances because they only have one element. Element is the representation of each type of atom. There are around 92 natural chemical elements on earth but scientists can combine them in laboratories and produce some more.



1.2. Compounds

They have equal molecules but two or more types of atoms. Water is a compound substance because it has got two elements:
hydrogen and oxygen. Other compounds are glucose, copper, sugar, rock salt and carbon dioxide



2.- Mixtures

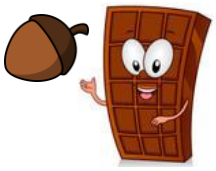
Mixtures have two or more different pure substances. Sea water is a mixture because it contains water and salt. The air is also a mixture because it contains many gases. A salad is a mixture because it has many different fruits and vegetables. There are two basic types of mixtures:

2.1.- Homogeneous mixtures or solution

If we cannot distinguish or identify the components of the mixture, the mixture is homogeneous. Sea water is a homogeneous mixture because we can only separate its substances by distillation.

2.2.- Heterogeneous mixtures

If we can distinguish the different components of the mixture, the mixture is heterogeneous. The mixture of water and oil is heterogeneous because we can see the different densities of the components.



1.- chocolate with nuts

2.- toothpaste

3.-Strawberries with cream

4.-salad

5.- shoe cream

6.- yogurt

7.- sea water

Acitivity 1

Look at the pictures. Are these mixtures **homogeneous** or **heterogeneous**?

1.-

2.-

3.-

4.-

5.-

6.-

7.-

3.- Techniques for the separation of mixtures:

We use different techniques. It depends on the kind of mixture.

3.1.- Techniques for the separation of the components of heterogeneous mixtures.

The main techniques of separation of the substances that integrate the heterogeneous mixtures are **decantating**, **sifting**, **filtration** and **magnetic separation**.

3.2.- Techniques for the separation of the components of homogeneous mixtures.

The main techniques of separation of the substances that integrate the homogeneous mixtures are **heating to dryness**, **crystallisation** and **distillation**.

Here you are some examples:

1. We can separate water from oil by ***decanting***.
2. We can separate sugar from iron particles by ***magnetic separation***.
3. We can separate sand from water by ***filtration***.
4. We can separate sugar from sand by ***filtration***.
5. We can separate salt from water by ***boiling***.

4.- Characteristic properties of pure substances.

Density: the density is the relationship between the mass of an object and its volume.

Boiling point: the temperature at which a substances changes from a liquid to a gas.

Melting point: the temperature at which a substance changes from a solid to a liquid.

melting point

boiling point

Activity 2. Are these statements TRUE or FALSE. Correct the false ones.

1. **Pure substances are homogeneous mixtures and compounds.** TRUE/FALSE

   .....

2. **There are 92 elements on earth.** TRUE/FALSE

   .....

3. **We use crystallisation with heterogeneous mixtures.** TRUE/FALSE

   .....

4. **We use filtration with heterogeneous mixtures.** TRUE/FALSE

   .....

5. **Mixtures have two or more different pure substances.** TRUE/FALSE

   .....

6. **Melting point is the temperature at which a substance changes from a liquid to a gas.** TRUE/FALSE

   .....

Activity 3.- Choose the best option in each case:

1-To separate sea water we use:
- a) Filtration
- b) Distillation
- c) Decantation

2-An example of pure substance is:
- a) Gold
- b) Glucose
- c) Milk with sugar

3-How can you know if a substance is pure?:
- a) They have got the same types of atoms
- b) They cannot be separated by physical means
- c) They have two or more different pure substances

4-Boiling point is:

a) The temperature at which a substance changes from a solid to a liquid
b) The temperature at which a substance changes from a liquid to a solid
c) The temperature at which a substances changes from a liquid to a gas

5-How can we separate heterogeneous mixtures?:

a) Using magnetic separation, crystallisation and heating to dryness
b) Using distillation, decantation and filtration
c) Using filtration, magnetic separation and decantation

6-Compounds have:

a) The same types of atoms
b) Equal molecules
c) Two or more different pure substances

Activity 4.- Unscramble the words, find them and write the secret message with the remaining letters

M	N	A	T	T	T	E	R	C	A	N
S	U	O	E	N	E	G	O	M	O	H
D	B	E	I	L	E	C	O	M	P	E
O	E	S	E	T	U	M	D	O	F	R
P	U	N	R	E	A	C	E	S	U	U
B	G	A	S	S	T	R	E	L	A	T
B	O	I	L	I	N	G	T	L	E	X
L	A	U	Q	E	T	N	C	L	O	I
E	S	A	N	D	M	Y	I	X	I	M
G	L	U	C	O	S	E	T	U	R	F
S	U	B	S	T	A	N	C	E	E	S

ILINGBO

COGLUSE

SITYDEN

HOGEMONESOU

EMENTLE

MXTIURE

EQULA

CULEMOLE

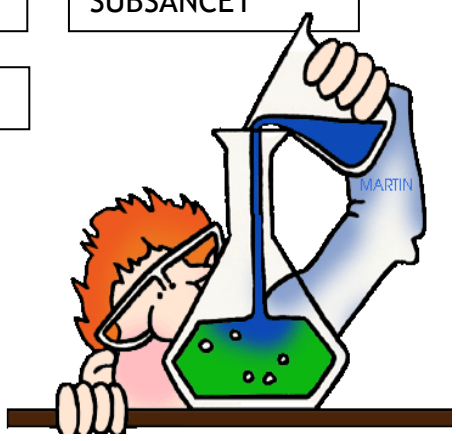
TRAFILTION

SUBSANCET

SGA

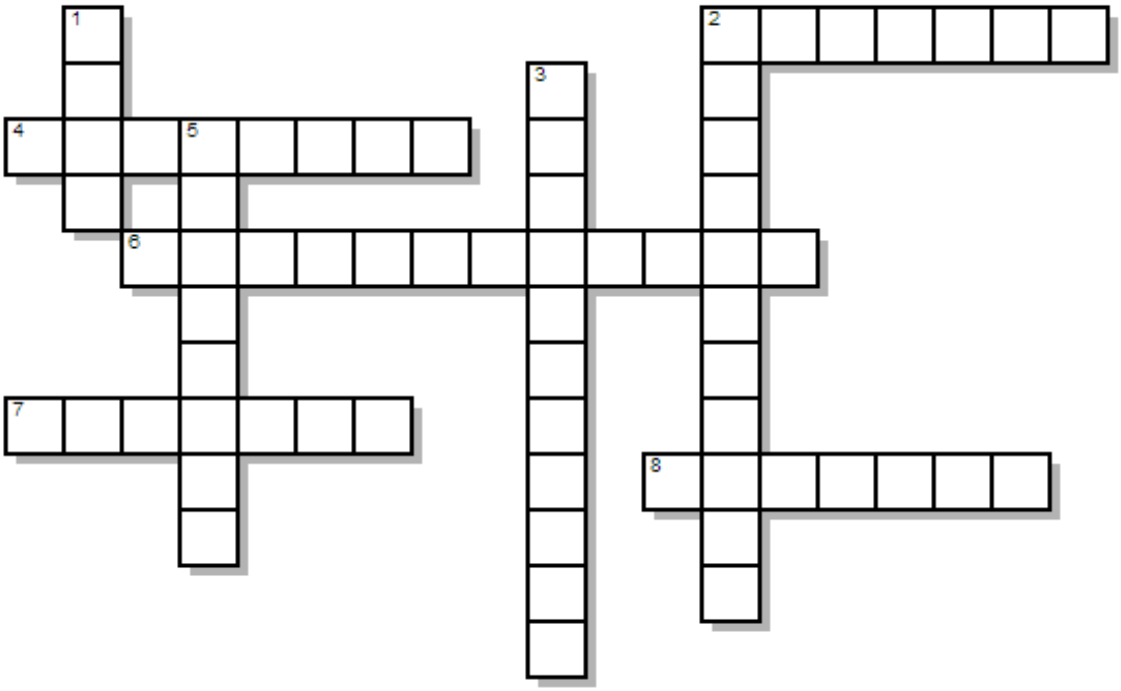
M	A									

					U	R	E		



Activity 5.- Crossword

SUBSTANCES AND MIXTURES



DOWN

1.- Element is the representation of each type of ....
2.- It's a technique for the separation of the components of heterogeneous mixtures
3.- Pure substances don't change their properties in the same conditions of pressure and ...
5. There are 92 on earth.

ACROSS

2.-The relationship between the mass of an object and its volume.
4.- Compounds are composed by them.
6.-The temperature at which a substance changes from a solid to a liquid.
7.- We use heating to ... to separate the components of homogeneous mixtures
8.-They have two or more different pure substances

Key:

Activity one
Activity two
Activity three
Activity four

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