GRUP D'EXPERIMENTACIÓ PER AL PLURILINGÜISME

MIXTURES AND SOLUTIONS ARE AROUND US!

Àrea: Physics and Chemistry 2n ESO

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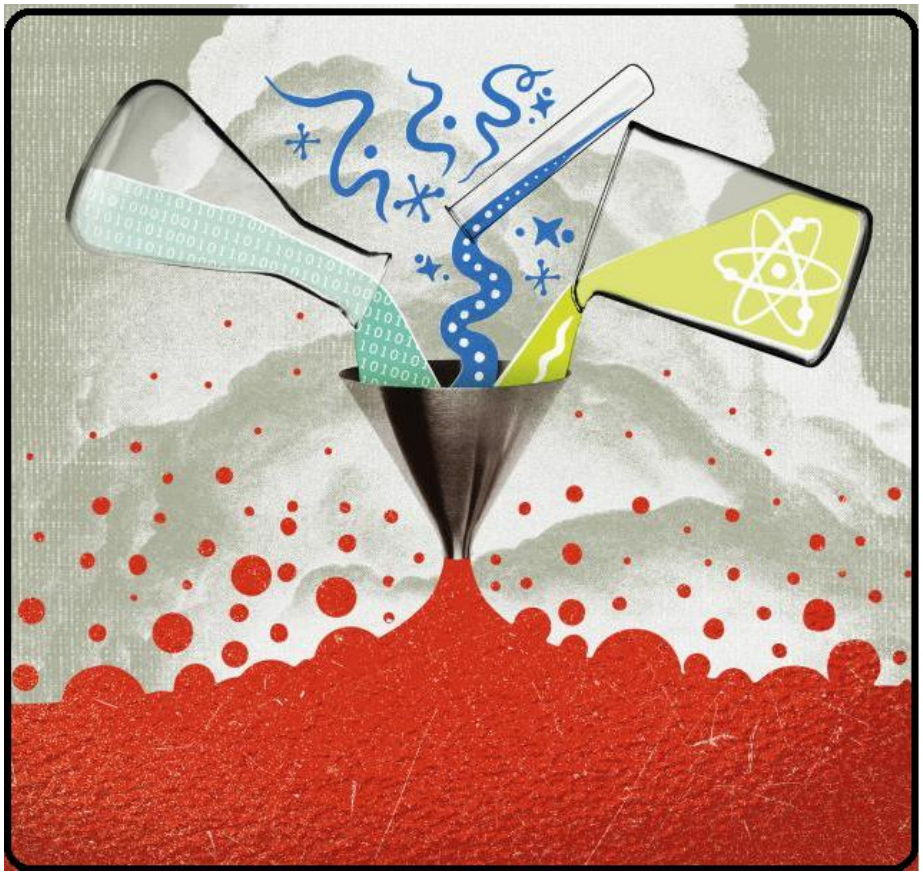

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GRUP D'EXPERIMENTACIÓ PER AL PLURILINGÜISME

Generalitat de Catalunya
Departament d'Ensenyament

MARC PER AL PLURILINGÜISME

A FAVOR DE L'ÈXIT ESCOLAR
PLURILINGÜISME

Material elaborat durant la realització de la formació adreçada als docents que implementen el pilotatge del GEP (Grup d'Experimentació per al Plurilingüisme) durant el curs 2016-2017, realitzada amb el/la formador/a Carlota Petit de la UAB.

SG de Llengua i Plurilingüisme
Servei de Llengües Estrangeres

January, 2017

Ten tips for learning success:

- You will appreciate that most materials and object around us are mixtures or solutions.
- You will recognize the difference between a mixture and a pure substance.
- You will be able to classify in different types of mixtures: homogeneous or heterogeneous ones.
- You will distinguish the type of heterogeneous mixtures, the suspensions and colloids.
- You will develop, communicate and justify a procedure to separate simple mixtures based on physical properties.
- You will collaborate and work in teams to separate mixtures through physical processes in the laboratory.
- You won´t be afraid of making mistakes.
- You will integrate the new contents and explain them with your own words.
- You will use English as much as you can to discuss and interact with your classmates.
- After discussing in group, you will do a presentation where you explain which are the most appropriate methods to separate components of a mixture given.

The Science of Macaroni Salad: What´s in a Mixture?

Imagine that it´s a hot day of August. You are at one of Barcelona´s many beaches. You have a glass of ice-cold lemonade to refresh yourself. Lemonade is a combination of lemon juice, water and sugar. Do you know what **kind of matter** lemonade is?

It's obviously not an **element** because it consists of more than one substance. Is it a **compound**? Not all combined substances are compounds. Some - including lemonade - are **mixtures**.

We have two ways of classifying mixtures. It can be: **heterogeneous** (They consist of visibly different substances or phases) or **homogeneous** (They have the same uniform appearance and composition throughout).

Heterogeneous mixture include **suspension**, **emulsion** and **colloid**. And homogeneous mixture is also called **solution**.

MIXTURES AND SOLUTIONS ARE AROUND US!

In the next video about macaroni salad you can learn more about mixtures and solutions.

http://ed.ted.com/lessons/the-science-of-macaroni-salad-what-s-in-a-mixture-josh-kurz

Activities:

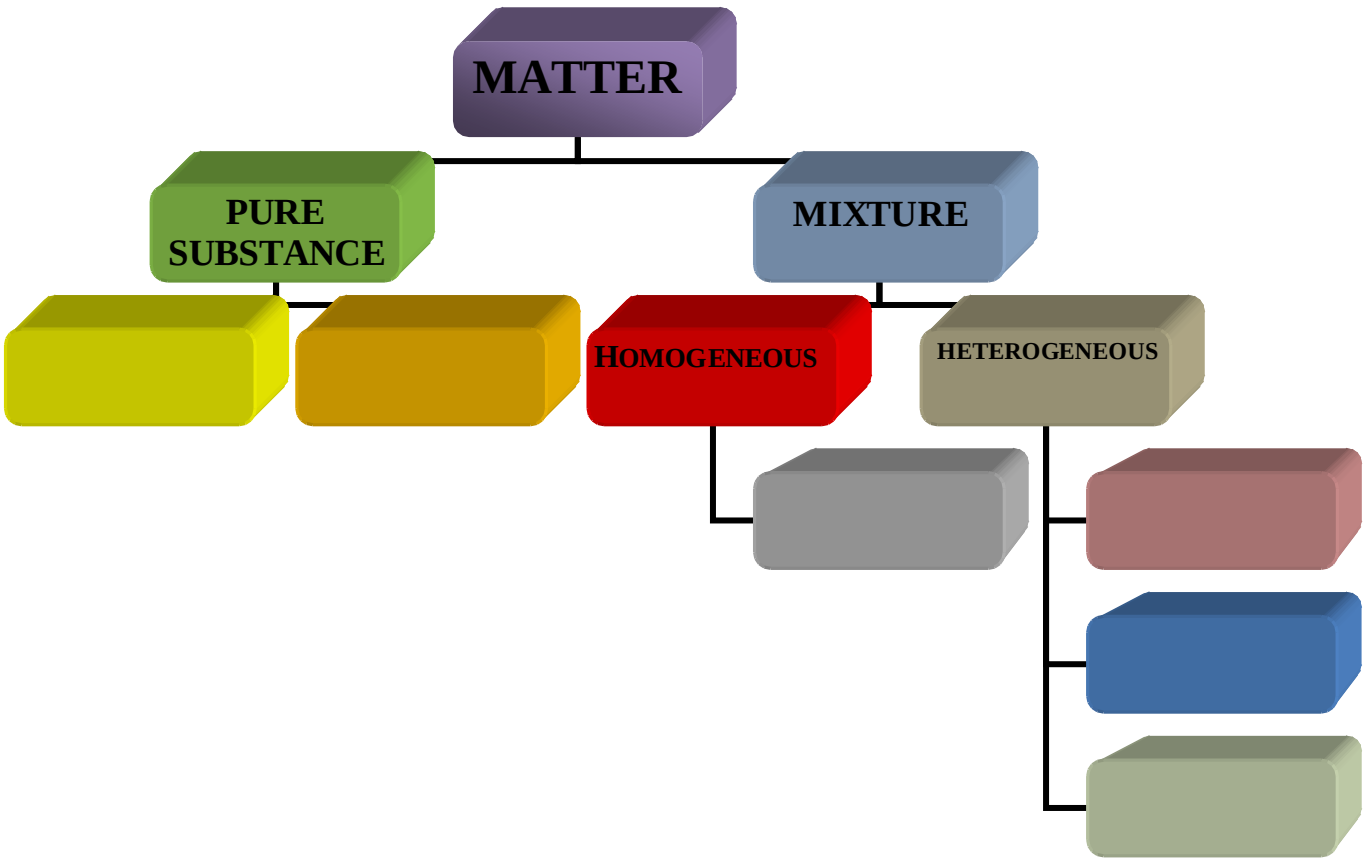
Do these activities individually and then discuss the answers in groups of four.

Explicit

- What is a mixture?

- There are three types of mixtures: solution, colloid and suspension. What are the difference between them?

- Complete the next scheme:



Implicit

- If we put sugar cubes in a bowl with hot water and stir, what kind of mixture we get? Why?

- And if we put sand instead of sugar? Why?

- Identify each material as either a mixture or pure substance. Mark with X.
  - If the material is a mixture, identify it as either homogeneous or heterogeneous.
  - If the material is a pure substance, identify it an element or a compound.

MATERIAL	PURE SUBSTANCE		MIXTURE	
	Element	Compound	Homogeneous	heterogeneous
Pizza				
Acetic acid				
Water				
Milk and cereal				
Gasoline				
Steel				
Blood				
Salt				

Referential

- Pick a mixture that you use on a daily basis. List the parts of the mixture and break each one do.

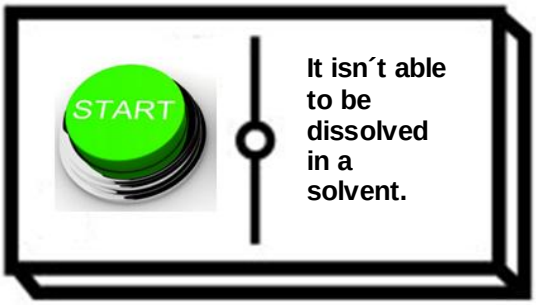
Revision Activity

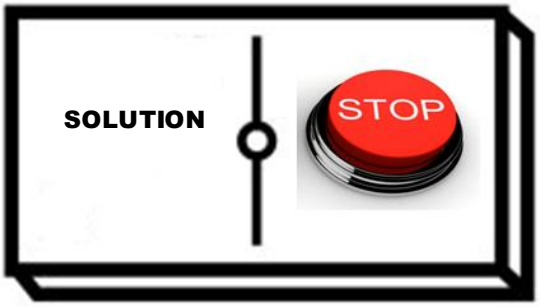
VOCABULARY DOMINOES

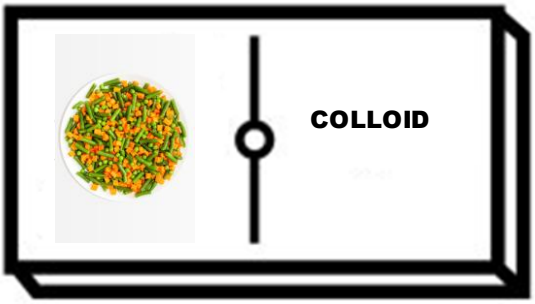
We are going to review different vocabulary of mixtures and solutions with a **vocabulary dominoes**.

In groups of four, you are going to create your own domino. Try to be original and don´t forget key words. You can draw or write the definitions of these words in your cards.

Examples:





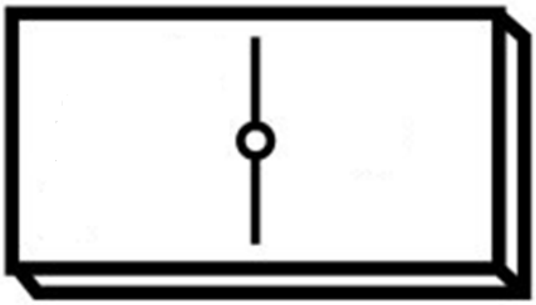
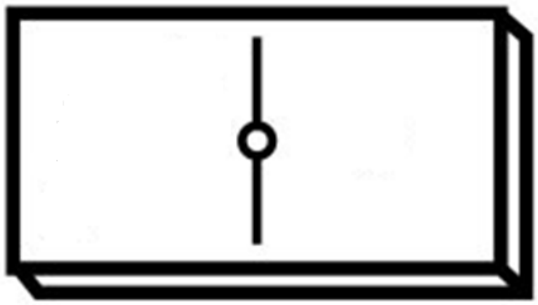
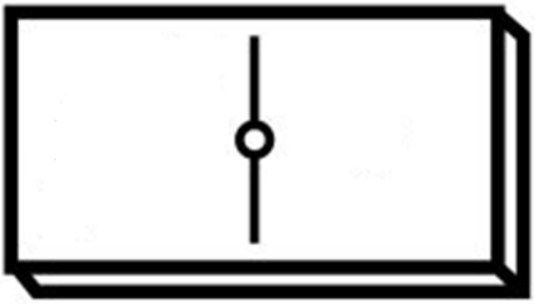
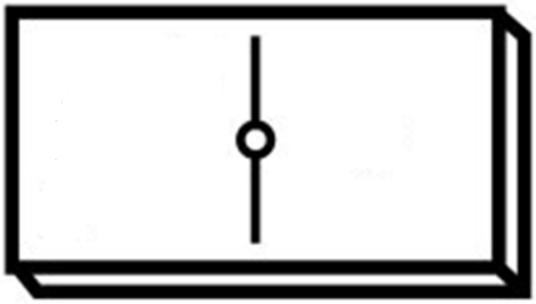
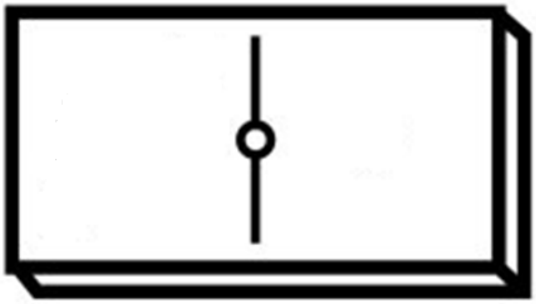
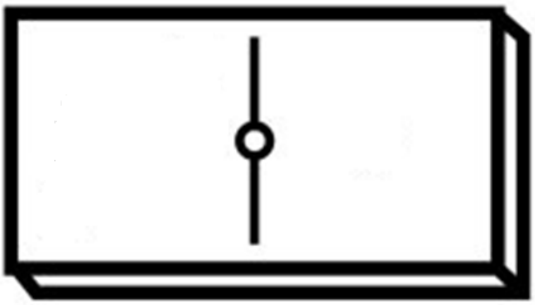
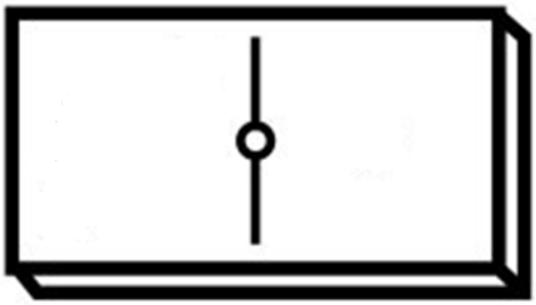
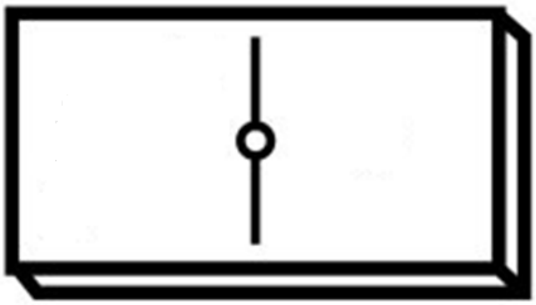


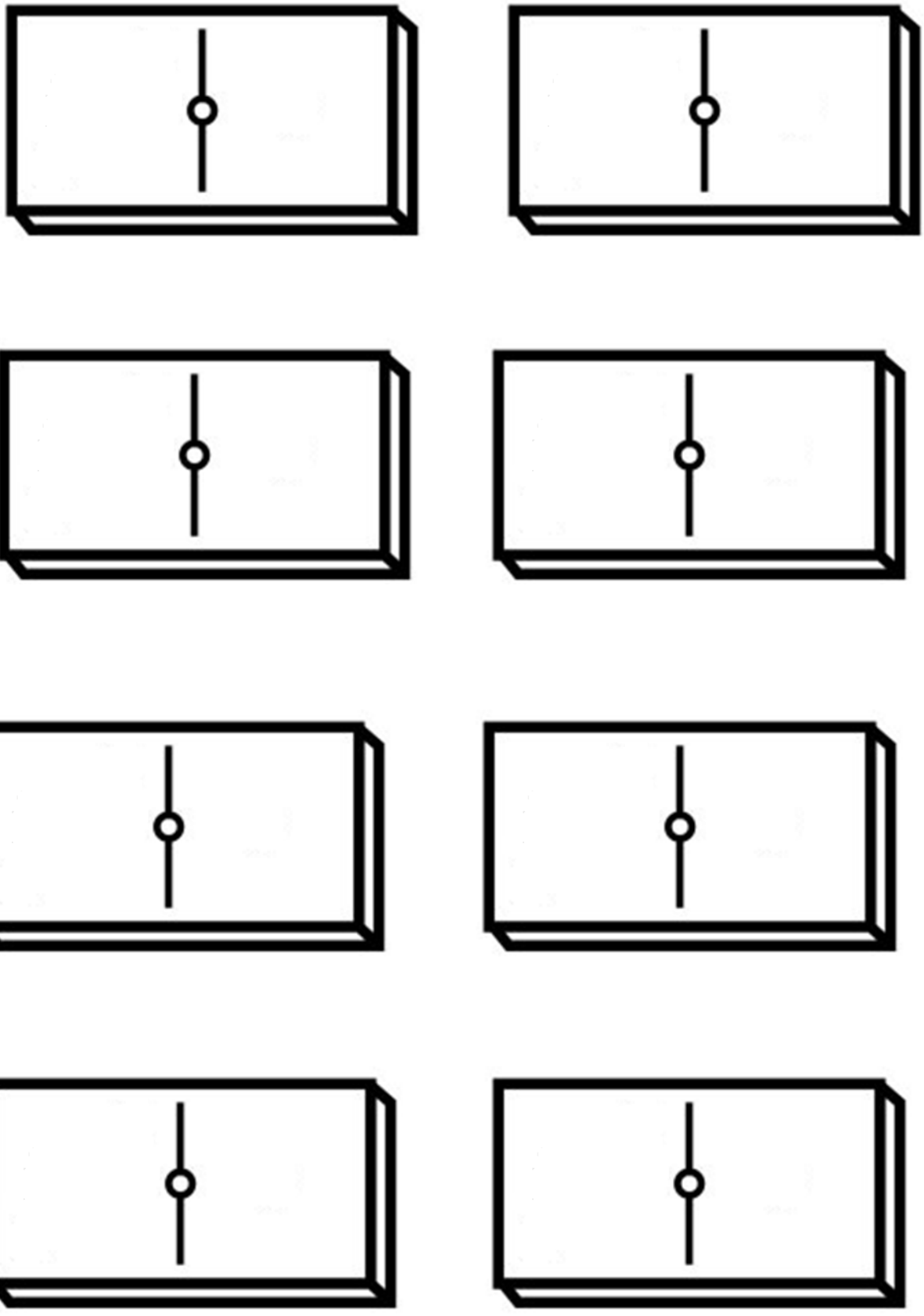
GRUP D'EXPERIMENTACIÓ PER AL PLURILINGÜISME

- Here is an exercise that can help you to remember some of the most important concepts that we have worked. Match the two columns.

	1.- It´s made up of visible parts.
	2.- It isn´t able to be dissolved in a solvent.
A.- Matter	3.- It´s any material that occupies space and has mass.
B.- Mixture	4.- Every part of the material is the same (only one set of properties).
C.- Pure substance	5.- The substance that dissolves in a solvent to form a solution.
D.- Solute	6.- It´s able to be dissolved in a solvent.
E.- Solvent	7.- The substance that dissolves a solute to form a solution
F.- Soluble	8.- A substance that can´t be broken down into any other substances by chemical or physical means.
G.- Insoluble	9.- A substance made of two or more elements chemically compound in a specific rate or proportion.
H.- Element	10.- A mixture in which the different parts can be seen and easily separated out.
I.- Compound	11.- A mixture that is so evenly mixed that the different parts can´t be differentiated simply by looking at them.
J.- Solution	12.- A homogeneous mixture that remains constantly and uniformly mixed and has particles that are so small that they can´t be seen with a microscope.
K.- Colloid	13.- A mixture containing small, undissolved particles that don´t settle out.
L.- Homogeneous mixture	
M.- Heterogeneous mixture	

These are the cards. Complete them.



Now it´s time to play!

Exchange your domino with another group and start playing. Play as many times as there are dominoes.

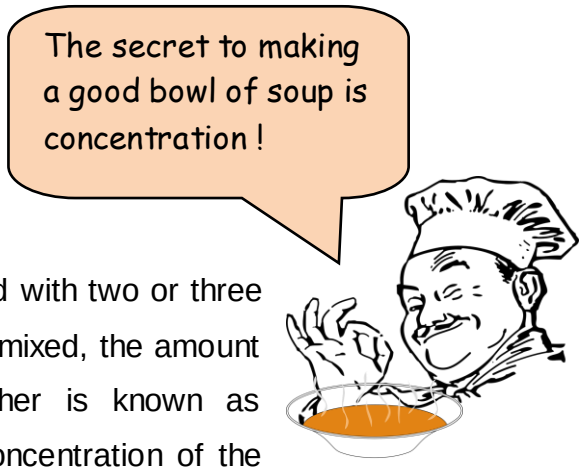
Game rules:

Deal out all the domino cards equally among the members of the group. Place start card in the middle of the table. The player with this card will be the first.

Play moves clockwise around the table with each player trying to put down a card that matches of the two ends of the domino track that is built up on the table.

If a player doesn´t have a suitable card to put down, then they miss a turn. The first player to get rid of all their domino cards is the winner.

Extension



The directions on a can of condensed soup say to mix the can of sop with one can of water. What would happen to the flavour if it were mixed with two or three cups of water instead? When two substances are mixed, the amount of one compared with the amount of the other is known as **concentration.** Adding extra water makes the concentration of the soup lower that what is called in the recipe.

Concentration **is a general term that expresses the quantity of solute contained in a given amount of solution**.

There are several ways of measuring concentrations:

Percent Composition (by mass)

The mass percent is used to express the concentration of a solution when the mass of a solute and the mass of a solution is given.

Use the following equation to calculate percent by mass:

$$\% \text{ mass} = \frac{\text{mass solute (g)}}{\text{mass solution (g)}} \times 100$$

Solution = solvent + solute

Percent composition (by volume)

The volume percent is used to express the concentration of a solution when the volume of a solute and the volume of a solution is given.

Use the following equation to calculate percent by volume:

$$\% \text{ volume} = \frac{\text{volume solute (ml)}}{\text{volume solution (ml)}} \times 100$$

Solution = solvent + solute

Grams per liter

Represent the mass of solute divided by the volume of solution, in liters. This measure of concentration is most often used when discussing the solubility of a solid in solution.

Use the following equation to calculate grams per liter:

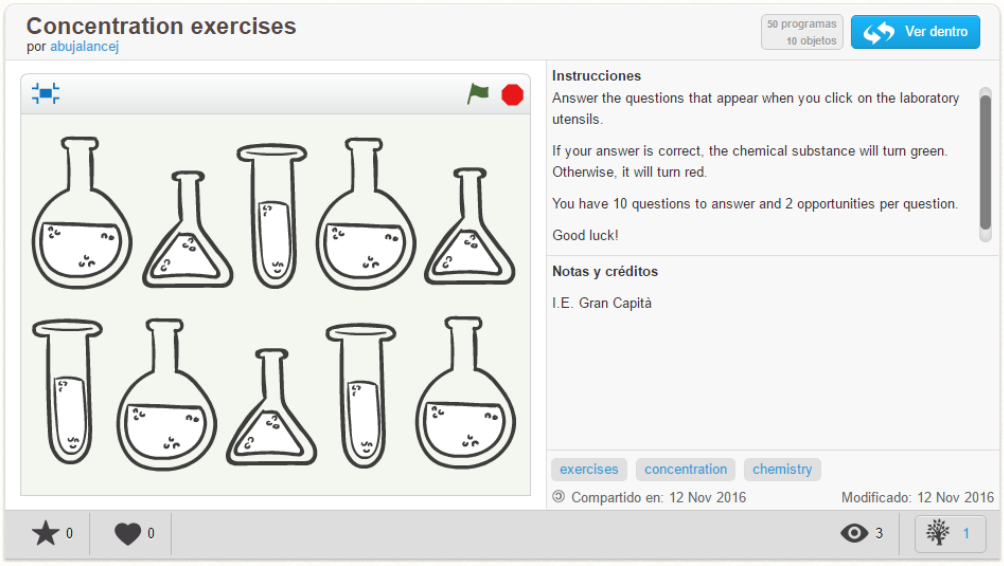
$$\text{Mass/Volume} = \frac{\text{Mass of Solute (g)}}{\text{Volume of Solution (L)}}$$

Solution = solvent + solute

- Do this activity in groups of four.

Imagine you're a chemist who has three assistants. Try to solve the following problems about concentration of solution.

You will use a program to know if the answers are correct or not. Enter this address and follow the instructions.(https://scratch.mit.edu/projects/130472742/, created in scratch by Adrián Bujalance, robotic teacher of Gran Capità and the problems are did by me).

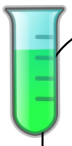


1.- A solution with 3 g of potassium chloride (KCl) in 100 g of water is prepared. Calculate the percentatge of mass of solute in the solution.

Data **Formula** **Resolution**

2.- A glucose solution is 30% mass. How much glucose is there in 100g of solution?

Data **Formula** **Resolution**



3.- We need to prepare 250 g of an aqueous solution of sodium bromide with 5% mass concentration. How much solute do we need?

Data **Formula** **Resolution**

4.- Vinegar is a solution with % mass of acetic acid. How much acid is there in 150 g of vinegar?

Data **Formula** **Resolution**

5.- A solution has been prepared with 30 g of sugar solved in water till we get 200 l of solution. Which is its mass concentration of sugar in g/L?

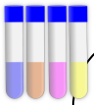
Data **Formula** **Resolution**

6.- We weight 5 g of sodium chloride and water is added till we have 250 ml of solution. What mass concentration of sodium chloride do we get?

Data **Formula** **Resolution**

7.- We need to prepare 150 ml of a 0g/L solution of iodine. How much iodine do we need?

Data **Formula** **Resolution**



8.- We need to prepare 300 ml of a ferric sulfate solution for fertilizing plants with a 12 g/L mass concentration. How much ferric sulfate mass do we need?

Data **Formula** **Resolution**

9.- What is the percentatge by volume concentration of a solution in which 75 ml of ethanol is diluted to a volume of 250 ml?

Data **Formula** **Resolution**

10.- What volume of acetic acid is present in a bottle containing 350 ml of a solution which measures 5% concentration?

Data **Formula** **Resolution**

How many chemical substances will turn green? And how many will turn red?

Paint them!!!

Project: collaborative problem solving

LET'S INVENT A MIXTURE MACHINE FOR THE LAB!

.... **that a mixture is a substance that comprises two or more elements and/or compounds that are physically intermingled but that have not reacted chemically to form new substances.**

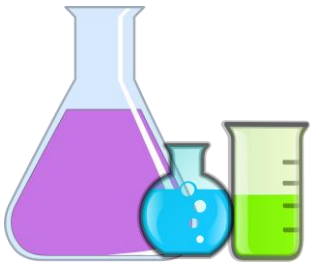
A mixture may be a solid, liquid, gas, or some combination of those states.

We are surrounded by mixtures, both in the chemistry lab and in everyday life.

The air we breathe is a mixture of nitrogen, oxygen, and small amounts of other gases. Our soft drinks are complex mixtures of water, sugar, carbon dioxide, and various organic compounds that provide colour and flavour. The food we eat is a complex mixture of organic and inorganic compounds.

Because the components of a mixture have not reacted chemically, it is possible to separate the mixture into its component substances by using purely physical means. Chemists have devised numerous methods for separating compounds based on differential physical characteristics, including differential solubility, distillation, recrystallization, solvent extraction, and chromatography.

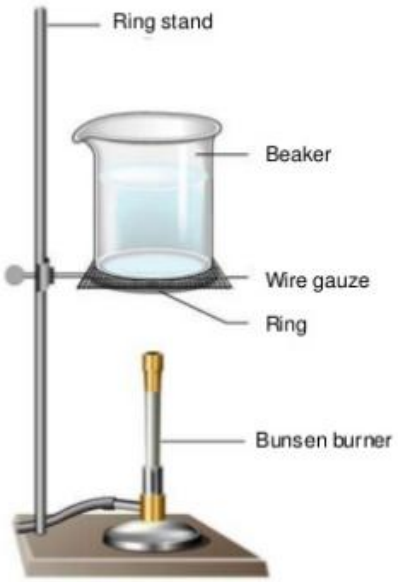
Project part 1 – Methods of separation



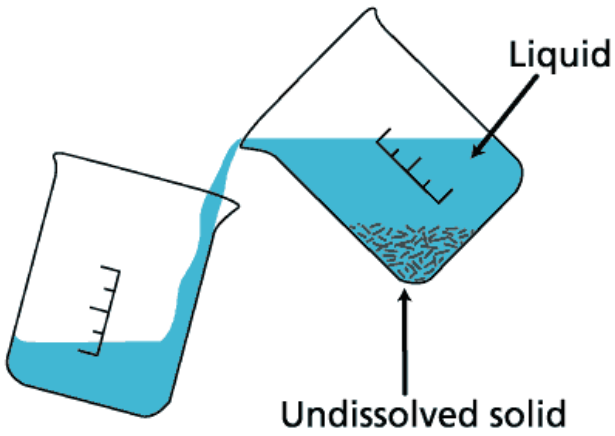
Look at the posters hanging on the windows. You have the different methods of separating mixtures and their characteristics.

MIXTURE OF SOLID AND LIQUIDS:

FILTRATION is used to separate a small insoluble solids from liquids.

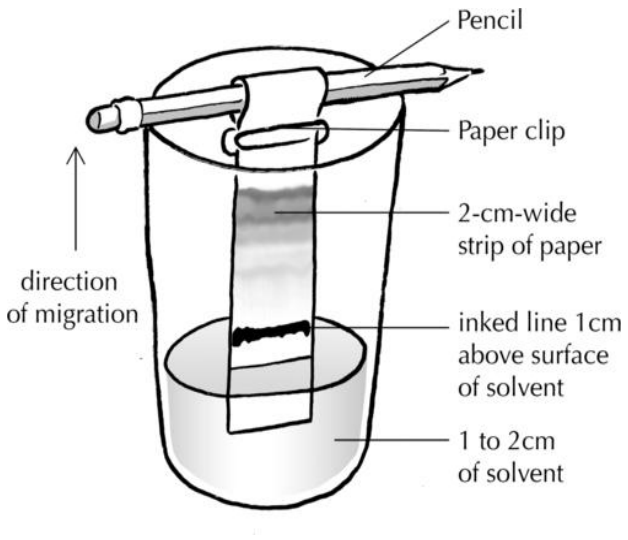


EVAPORATION is used to separate solids from liquids in homogeneous mixtures. When the liquid evaporates, the solids remain.

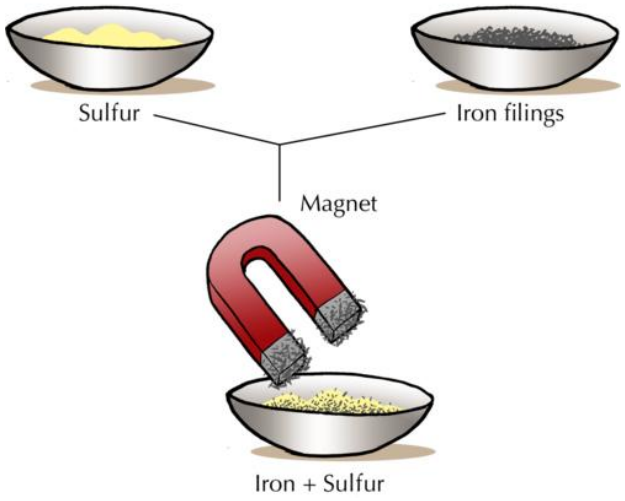


DECANTATION is used to separate a big insoluble solids from liquids.

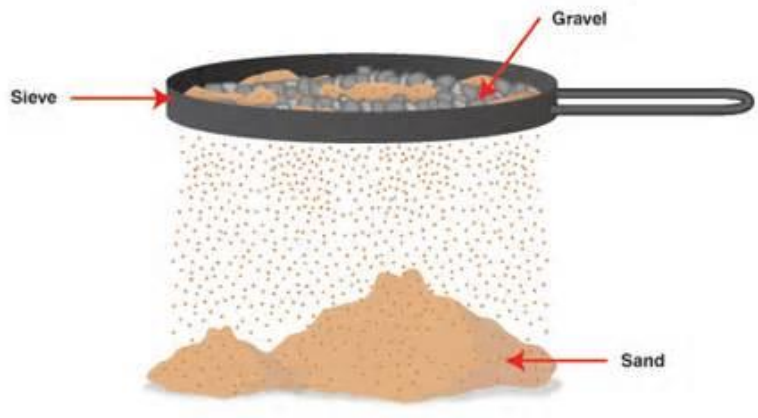
MIXTURE OF SOLIDS:



CROMATOGRAPHY is used to separated dissolved substances that have different colours. It works because some of the coloured substances dissolve in the liquid better than others, so they travel further up to paper.

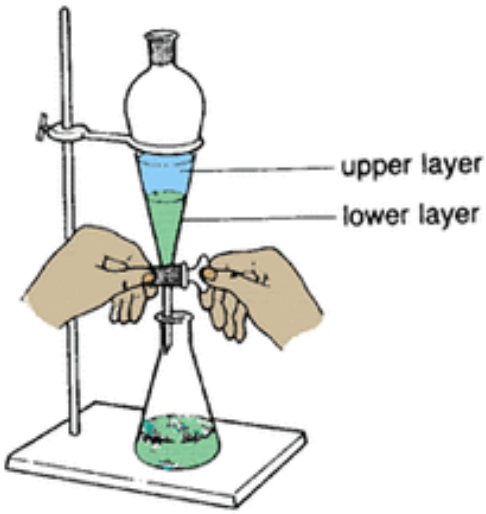


MAGNETISM is used to separated mixtures of two solids with one part having magnetic properties.

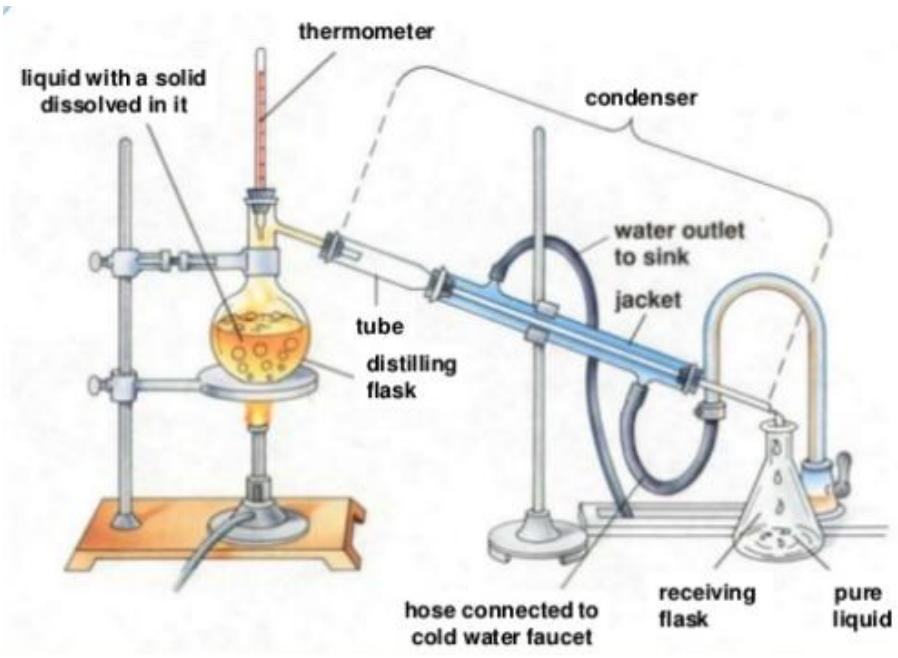


SIEVING is used to separated two or more solids of different size.

MIXTURE OF LIQUIDS:



SEPARATING FUNNEL is used to separated two liquids that do not dissolve very well in each other (immiscible liquids) by taking advantage of their unequal density.



DISTILLATION is used to separated liquids that have different boiling points in homogeneous mixtures. The mixture is heated until one of the liquids boils and turns to gas. This gas is condensed back into liquid form and collected.

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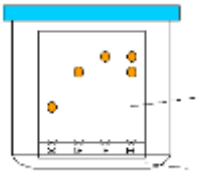
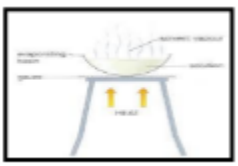
Try to answer the following questions with the information you have obtained in the posters. Remember that only one component of the group can go to look for the information and he/she will have to explain it to the rest. There must go a different component in each exercise.

- **Match the method of separation to the name and picture by lines.**

MAGNETISM	**Separates liquids with different boiling points**	
EVAPORATION	**Separates magnetic material from non-magnetic**	
FILTRATION	**Separates liquids of different colours**	
DISTILLATION	**Separates insoluble solid from a liquid**	
CHROMATOGRAPHY	**Separates a soluble solid by boiling off**	

- **Use the word bank in the box to fill in the gaps.**

evaporates	dissolve	filter	condenser
boiling point	liquid	condenses	

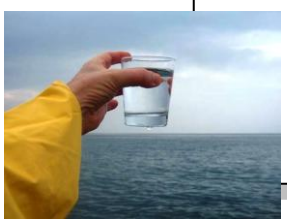
Distillation can be used to separate two or more liquids. The mixture is boiled and the gas with the lowest _____ _____ goes into the _____ first. It _____ into a liquid and is collected. The other liquid is left behind.

Filtration is used to separate a solid from a liquid using a filter. The solid cannot _____ in the liquid and it also cannot pass through the holes in the _____, but the liquid can.

Evaporation is used to separate a solid that is dissolved in a _____. As the liquid _____ into a gas, it leaves the solid behind, often as crystals.

- **Using the information above, explain whether you would use filtration, evaporation or distillation in each of these cases.**

1. Greg lives by the sea and wants to make his own sea-salt for cooking. He gets it from seawater.



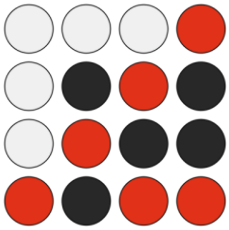
2. Eric has made some brandy at home. He wants it to be stronger by removing some of the water.

3. Boris accidentally drops 1kg of sugar in a bucket of hot water. It dissolves, but he wants to get the solid sugar back.

4. Lily is shipwrecked on an island. She needs clean water, but there isn't any – just a swamp with muddy water.

5. Angus has a bottle of alcohol mixed with water. He wants to remove the alcohol from the water to use as a fuel.

CONNECT FOUR



INSTRUCTIONS:

Each pair of students has the board below with 16 words. The teacher calls out clues and students must mark the appropriate term until they connect four spaces in a row or column. The first pair of students who succeed, win. It´s important that couples help each other.

Board

Filtration	**Sifting**	**Magnetic Attraction**	**Evaporation**
Chromatography	**Floatation**	**Solute**	**Solvent**
Solution	**Heterogeneous Mixture**	**Physical Properties**	**Chemical Mixture**
Concentration	**Distillation**	**Separating Funnel**	**Decantation**

When a strain or thin paper is used to separate solid particles from a liquid.
When a number of screens are used to separate smaller particles from large ones.
Used to separate certain metals from other materials.
Used to separate a solid from a liquid in which it has been dissolved.
Technique to separate and analyze the solutes in a solution.
Used to separate mixtures when certain solids move up when placed in water.
The solid that dissolves in a solution.
The liquid in a solution that does the dissolving.
A type of mixture where a solid has been dissolved in a liquid.
A mixture where the different particles can easily be seen and separated.
These don´t change when particles mix and there is NO chemical reaction.
A type of mixture where new substances are formed.
The ratio of the amount of solute to solvent in a mixture.
Used to separate two liquids with different boiling points.
Used to separated immiscible liquids.
Used to pour off the liquid leaving the solid behind.

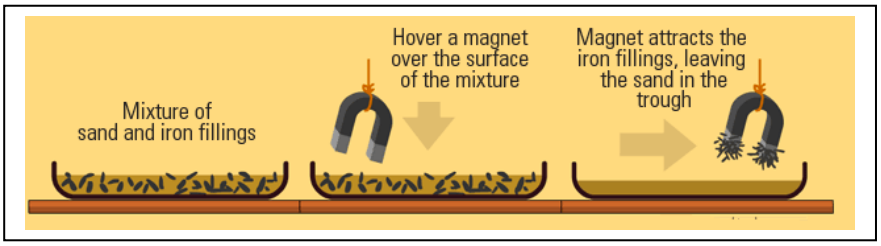
Project part 2 – In the lab

In groups of four, do the following experiments and fill the fact sheets.

Remember laboratory standards.

Experiment 1: Magnetic Separation

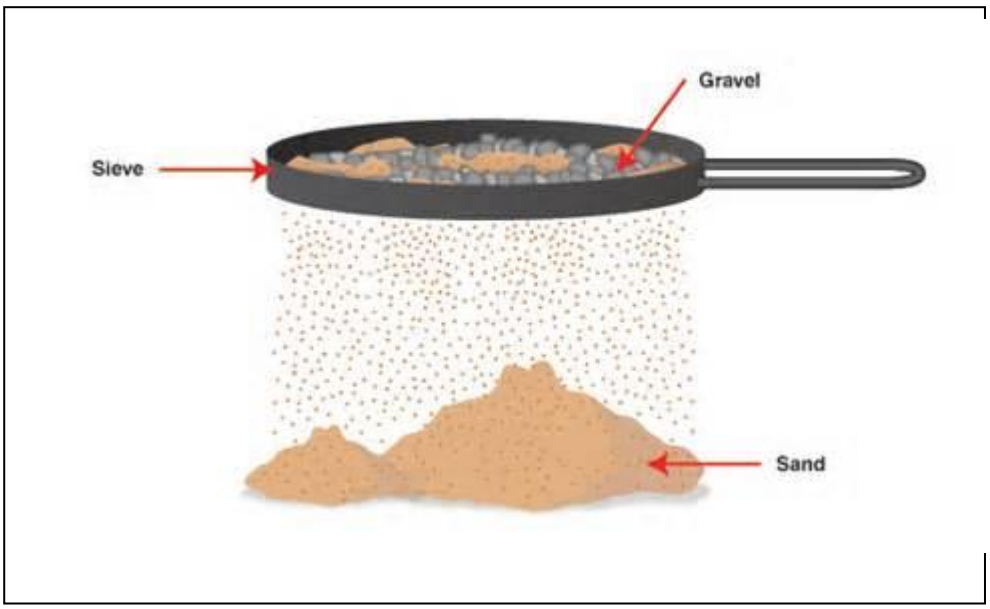
To separate a mixture of sand and iron filing, spread out the mixture on a flat surface. Run a magnet over the surface. You will notice that the magnetic elements (iron filings) will be attracted to the magnet over it. After a number of runs, all the sand will be free from any iron filing.



(http://www.eschooltoday.com/science/elements-mixtures-compounds/separation-of-mixtures.html)

Experiment 2: Sieving

Sieving is done by shaking the sieve using hands, the sample that goes through is collected onto a tray and that retained on the sierve is put separately.

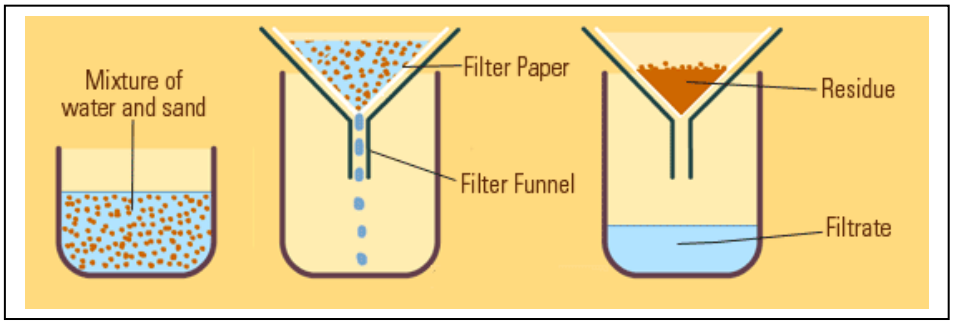


Experiment 3: Filtration

This process involves the use of a filter paper placed un a filter funnel. The funnel is placed in a breaker and the mixture of water and sand is poured into the funnel.

The liquid part drains through the filter paper into the beaker, leaving the solid sand particles trapped on the filter.

In filtration, the liquid part collected is called the **filtrate** and the solid bit that remained on the filter paper is called **residue**.



(http://www.eschooltoday.com/science/elements-mixtures-compounds/separation-of-mixtures.html)

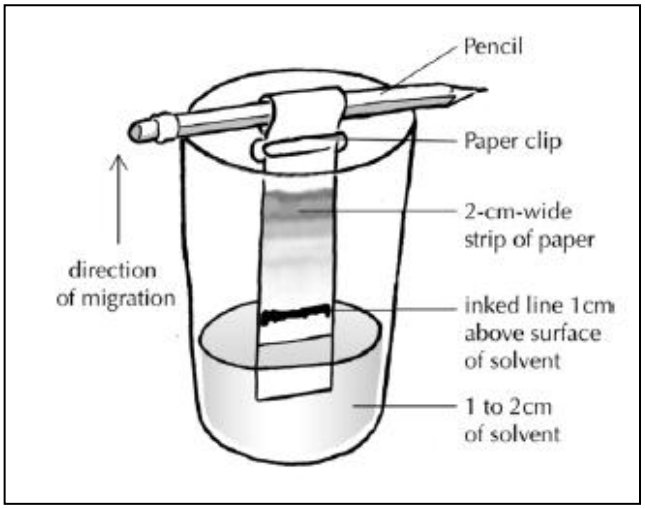
Experiment 4: Chromatography

To make a strip chromatogram you must follow the following steps:

1. Use a black pen or marker to draw a line across one end of the paper strip, 2 cm from the end.

2. Pour the alcohol into the beaker to a depth of approximately 1 cm.

3. Wrap the unmarked end of the paper strip around the pencil and secure it in place with a paper clip.



4. Before putting it into the glass, adjust the strip of paper so that the height of the inked line is approximately 1 cm above the surface of the liquid by holding it against the outside of the beaker.

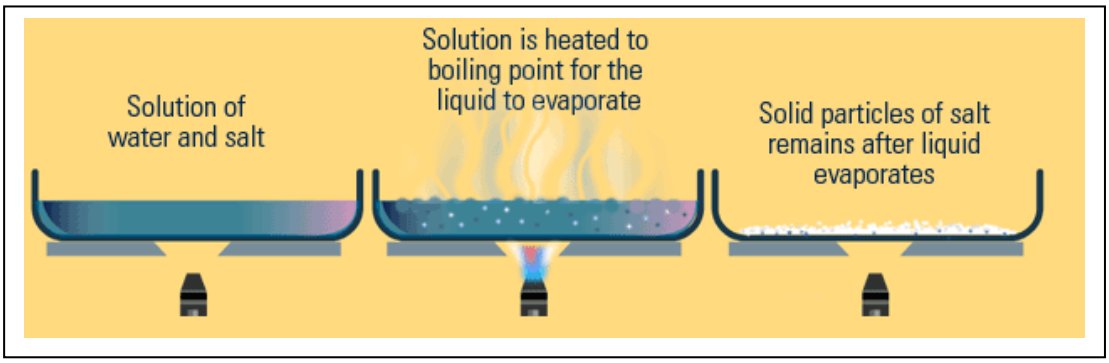
5. Lower the strip into the glass and rest the pencil across the top of the glass as shown in the diagram. The end of the strip should be in the alcohol, but the inked line should be above the surface of the alcohol.

6. Allow the liquid to soak up into the paper, rising through the inked line.

7. When the migrating pigments approach the top of the strip, near the paper clip, remove the paper strip and allow it to dry on a flat, nonporous surface.

Experiment 5: Evaporation

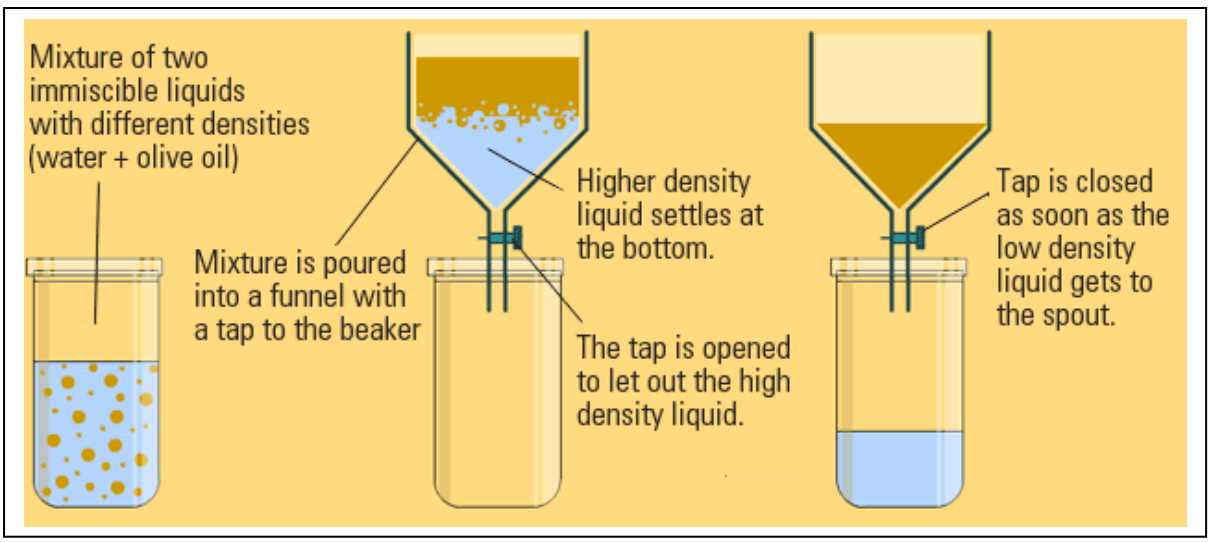
The process involves heating the solution until the solvent evaporates (turns into gas) leaving behind the solid residue.



(http://www.eschooltoday.com/science/elements-mixtures-compounds/separation-of-mixtures.html)

Experiment 6: Separation Funnel

The two liquids in the mixture have different densities, making the heavier liquid settle at the base of the container. In this setup, a funnel with a tap at the spout is placed inside a beaker. The mixture is poured into the funnel and allowed to settle. Soon, the water, which is heavier, settles at the base, with the oil (lower density) on top of it. The tap is opened to allow the water to pass, and closed as soon as the oil reached the spout.



(http://www.eschooltoday.com/science/elements-mixtures-compounds/separation-of-mixtures.html)

FACT SHEETS:

Experiment 1: Magnetic Separation	*Experiment 2: Sieving*
Materials: Iron filings and sand **Tools**: Magnet **Hypothesis**: I predict that _____ _____ _____ Did magnet attract it from mixture? Iron filings Yes or No Sand Yes or No **Analysis:** Did magnet separate the mixture? Yes or No Explain what happened: _____ _____ _____ _____ _____ _____ _____ _____	**Materials:** Sand and rocks **Tools**: screen **Hypothesis**: I predict that _____ _____ _____ Did sifter let it pass through? Sand Yes or No Rocks Yes or No **Analysis:** Explain what happened: _____ _____ _____ _____ _____ _____ Why were some items separated by the screen and others were not? _____ _____

Experiment 3: Filtration	***Experiment 4: Chromatography***
Materials: Sand and water **Tools**: filter paper and funnel **Hypothesis**: I predict that _____ _____ _____ **Analysis**: Explain what happened: _____ _____ _____ _____ _____ _____ _____ What allows some particles to pass through the filter and other not to? _____ _____ _____ _____	**Materials:** Filter paper, alcohol, black ink **Tools**: cup of alcohol **Hypothesis**: I predict that _____ _____ _____ **Analysis**: Explain what happened: _____ _____ _____ _____ _____ _____ _____ What type of mixture is the ink? _____ _____ _____

Experiment 5: Evaporation	***Experiment 6: Separating funnel***
Materials: water and salt Tools: Bunsen Hypothesis: I predict that_____ _____ _____ Have you recovered all the salt? Yes or No Analysis: Explain what happened: _____ _____ _____ _____ _____ _____ Do you think there would be any way to recover the water after the evaporation process? If so, which one? _____ _____ _____	**Materials:** Water and oil Tools: separating tunnel Hypothesis: I predict that_____ _____ _____ Did water and oil separate? Yes or No Analysis: Explain what happened: _____ _____ _____ _____ _____ _____ _____ What type of substances are oil and water? _____ _____

- **After having worked in the laboratory separating the different mixtures, try to help Jessica and Erin.**

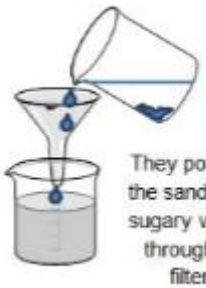
  Jessica and Erin´s science teacher has set them a problem to solve. They have been given a mixture of sand, iron filings and sugar and their teacher has asked them what they would do to separate the three substances.

  Here are eight pictures showing the stages in the experiment. Look carefully at each picture and decide which letter represents the starting point of the experiment and then order the rest.

A

Mixture of sand, iron filings and sugar

B



They poured the sand and sugary water through a filter

C

They warmed the sugary water over a gentle flame

D

They used a magnet to remove the iron

E

The remaining water evaporated to leave the sugar crystals behind

F

They added some water to the sand and sugar

G

They stirred the mixture so the sugar dissolved in the water but the sand did not

H

They saw the sugary water go through the filter but the sand was left behind

ORDER: _____

Project part 3 – Make and introduce your separating machine.

Design and built a separating machine that will separate a mixture of three substances.

HOW TO COMPLETE THE TASK:

1.- Choose the components of your three part mixture.

2.- Do some research using class notes, your textbook and the internet, on ways to separate the types of components in your chosen mixture.

3.- Design your machine on paper.

4.- Built your machine.

5.- Display your machine, diagram, instructions, explanations, advantages and applications to your teacher and your classmates.

6.- Remember to organize yourselves in groups of four and all of you <u>have to talk equally</u>.

1

You must greet to all the components of the group and the name of your separating machine. Also you must give the information on what mixture your machine will separate.

2

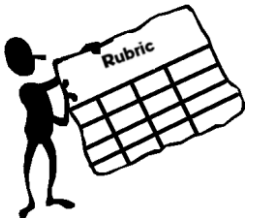
You must give the instructions to know how to use your machine.

3

You must explain about why you have chosen these processes and their advantages for separing your mixture.

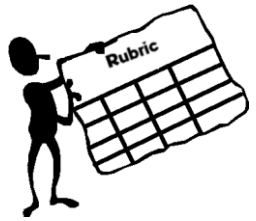
4

You must specify real world connections. For example, specific uses of the processes in industry, at home or elsewhere.



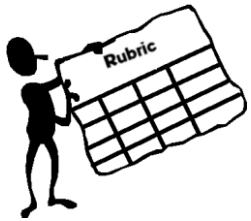
Assessment of / for / as learning:

TASKS 	5 	4 	3 	2 	1 
Introductory video					
Understanding the video 	*You can **easily** understand the information of the video.*	*You can understand **most** of the information of the video.*	*You can understand **some** of the information of the video.*	*You can understand **very little** of the information of the video.*	*You **can´t** understand the information of the video.*
Answering the questions 	*You can **easily** answer the questions and don´t make any mistake.*	*You can answer **most** of the questions and don´t make any mistake.*	*You can answer **some** of the questions and make some mistakes.*	*You can answer **fewer** questions and make a lot of mistakes.*	*You **can´t** answer the questions and you have everything wrong.*
Revision activity					
Applying information 	*You can **easily** use and apply the information to talk about mixtures.*	*You can use and apply **most of** the information to talk about mixtures.*	*You can use and apply **some** of the information to talk about mixtures.*	*You can use and apply **fewer** of the information to talk about mixtures.*	*You **can´t** use and apply the information to talk about mixtures.*



Assessment of / for / as learning:

TASKS 	5 	4 	3 	2 	1 
Extension Activity					
Applying information 	*You can **easily** use and apply formulas of concentrations.*	*You can use and apply in **most of** situations formulas of concentration.*	*You can use and apply **sometimes** formulas of concentration.*	*You can use and apply **fewer** formulas of concentration.*	*You **can´t** use and apply formulas of concentration.*
Project: Lab 	*You **easily** collaborate and work in teams to separate **all** mixtures through physical processes in the laboratory.*	*You collaborate and work in teams to separate **most of** mixtures through physical processes in the laboratory.*	*You **sometimes** collaborate and work in teams to separate **some** mixtures through physical processes in the laboratory.*	*You **more or less** collaborate and work in teams to separate **fewer** mixtures through physical processes in the laboratory.*	*You **don´t** collaborate and work in teams to separate mixtures through physical processes in the laboratory.*

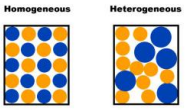


Assessment of / for / as learning:

TASKS 	5 	4 	3 	2 	1 
Project: Make a machine 	*You participated in **all** the aspects of making a machine with your group. You have worked **extremely well** and solved issues with group members*	*You participated in **most** of the aspects of making a machine with your group. You have worked **very well** and solved issues with group members*	*You participated in **some** of the aspects of making a machine with your group. You have worked **well** and solved issues with group members*	*You **barely** participated in the aspects of making a machine with your group. You have worked little and solved **none** of the issues with group members*	*You **didin´t** participate in the aspects of making a machine with your group. You **haven´t** worked and solved issues with group members*
Project: Presentation 	*Presentation was **very** informative, well organized, interesting and relevant to the assignment.*	*Presentation was informative, organized, and provided **ample** information relevant to the assignment.*	*Presentation provided **adequate** information, **some** key concepts left out, organization was **acceptable**.*	*Relevant information was **minimal**, many concepts were **unrelated**, **poorly** organized.*	*Information **wasn´t** informative, or relevant to the assignment, no apparent organization.*

Checklist

In this unit, have you ...?

	YES	NO	Teacher´s opinion
❖ appreciated that most materials and object around us are mixtures or solutions. 			
❖ recognized the difference between a mixture and a pure substance.			
❖ been able to classify in different types of mixtures: homogeneous or heterogeneous ones. 			
❖ distinguished the type of heterogeneous mixtures, the suspensions and colloids.			
❖ developed, communicated and justified a procedure to separate simple mixtures based on physical properties. 			
❖ collaborated and worked in teams to separate mixtures through physical processes in the laboratory. 			
❖ no been afraid of making mistakes.			

- integrated the new contents and explained them with your own words.

- used English as much as you could to discuss and interact with your classmates.
- done a presentation where you explained which are the most appropriate methods to separate components of a mixture given, after discussing in group.

YES	NO	Teacher´s opinion

Comments:

Is there anything you want the teacher to know about your work? Write it here.