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| ***MAKING SOAP*** |
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| ***Objetives*** |
| * ***Analysis of an environmental problem: oil waste***
* ***Recycling and reusing a product which is usually discarded***
* ***Learning how to make soap at (WITH THE HELP OF AN EXPERT)***
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| ***Introduction*** |
| ***In the past, soap used to be made at home but this tradition is coming into oblivion. Nevertheless, although risky for the use of Caustic Soda, it is an easy and rewarding activity apart from an useful way to recycle and reuse cooking oil. Natural colorants and essence improve the look of the product. This experience has been planned to reflect on the environment because of oil waste. We studied the proportions of Caustic Soda, water and oil, as well as colorant and essence to remain in our home-made soap.*** |
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| ***Materials*** | ***Ingredients*** |
| * ***Moulds (tetra bricks, etc)***
* ***Bowls***
* ***Balloon whisk (mixer or Thermomix)***
* ***Glasses 500ml***
* ***Precision balance***
* ***Trays***
* ***Spoons***
* ***Plastic containers***
* ***Gloves***
* ***Masks***
 | * ***Used cooking oil (not from fish)***
* ***Olive Oil, sunflower…***
* ***Caustic Soda (sodium hydroxide)***
* ***Natural colorants (red, blue, …)***
* ***Scent and ornament (lemon, eucalyptus, orange blossom, thyme, cynamon)***
* ***Water***
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| ***Procedure*** |
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| http://www.jpimentel.com/ciencias_experimentales/IMAGENES/La_ciencia_a_tu_alcance_I/exp_fabricacion_de_jabon.jpg |
| **Soap bars in different shapes, colours and scent.** |

 | * ***Pour 2L of oil into a bowl. Dissolve 225g of caustic soda in 2L of water and add the oil little by Little and very carefully because caustic soda gets really hot when mixed with wáter, if splashed, it can cause severe burns. Stir slowly for a while in the same direction and add colorant 20g till well mixed, then add 150 drops of scent and go on stirring for longer (a mixer can be used). After that, pour the mix into moulds. We’ve used “Termomix” to make it faster and get better results.***
* ***Students have been split into small groups of 4 or 5 and so the proportions of the ingredients.***
* ***Settle for a few days, never under the sun because it could melt.***
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| * ***NOTE: For less liquid results, pour less water (aprox 1,80 L) and less caustic soda (200 g aprox.). You can heat the mix to get more solid bars of soap. We haven’t done it not to leave scent go away and not to denaturalise oil.***
* ***Blue and red, which will change into green and orange are the best colorants to give a good aspect to soap bars.***
* ***Eucalytus, cynamon and orange blossom are the best essences as they don’t evaporate so easily. If you want more intense results, add more quantity or buy essence at the Chemist’s.***
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| ***Precautions*** |
| ***Making soap is risky due to the use of chemicals, caustic soda can cause scalding.*** |
| ***Scientific explanation*** |
| ***Theoretical basis: Obtaining soap is a chemical reaction that consists in the hydrolysis of an ester.******ESTER + CAUSTIC SODA   =====>  SOAP + ALCOHOL******In the case of the oil we have used, the main component is glycerine trioleate and this is the reaction es:******glycerine trioleate (olive oil) + sodium hydroxide*** ***=====>   SOAP + glycerine***

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| http://www.jpimentel.com/ciencias_experimentales/IMAGENES/La_ciencia_a_tu_alcance_I/exp_fabricacion_de_jabon_2.jpg |

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| ***Curiosities*** |
| * ***Manufacturing soap dates back to the times when germanic tribes in the period of Caesar used to boil goat lard with potash, it was obtained by leaching of firewood ashes. The same chemical reaction modern soap manufacturers use nowadays but at a larger scale. This product has become more and more refined and with higher quality raw materials.***
* ***The use of soap as a product to clean dates back to about 1000 years, when mediterranean peoples produced modest quantities of soap with available types of lard, animal or vegetal, in their regions.***
* ***It was in the 19th century that the French Chemist LeBlanc invented a process to turn common salt into caustic soda, the same component derived from tree ashes.***
* ***The development of the process to obtain caustic soda reduced its cost and improved the quality and quantity of this substance which was essential to the growth of soap industry.***
* ***Throughout the 19th century soap manufacturing improved thanks to the discovery of fatty acids which was the basis to modern processes. Caustic soda would produce one of the strongest types of sodium soap, while potash KOH would result in one of the mildest. Besides, depending on the selection of oil or lard, we can obtain liquid soap.***
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| ***Bibliography*** |
| * [***Jabón***](http://html.rincondelvago.com/jabon_1.html) (Soap)
* [***Algunas fórmulas para el trabajo con aceites y esencias. Introducción a la fitoterapia.***](http://www.almeriware.net/almediam/articulos/articulos_090.htm) (formulae to work with oils ans scents. Fitotherapy)
* [***Elaboración de jabón de varios colores paso a paso.***](http://www.manualidadesybellasartes.com/jabonhalloween.html)
* [***Fabricación de jabón casero.***](http://tabloide.eurofull.com/shop/detallenot.asp?notid=69) (Home-made soap)
* [***Fabricando jabón***](http://centros5.pntic.mec.es/ies.victoria.kent/Rincon-C/Practica/PR-21/PR-21.htm)
* [***Algunas recetas de fabricación de jabón de la Botica de la Abuela***](http://boticabuela.com/paginas/remedios/rem_resultado.asp?busca_rem=jabon&Submit=Buscar) (recipes according to The Grandma’s drugstore- in Spanish)
* [***Jabotecasoapyworld***](http://www.soapyworld.com/jaboteca.htm)
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