

Name:..... Date:.....

## Cleaning chemistry

There are many different recipes for making soap. This one can be made from ingredients you can buy in a supermarket. The instructions use one block of fat. Everything must be weighed accurately to get the best results.

### Making soap

#### What you need

- Two thermometers 0–100 °C
- 250 cm<sup>3</sup> beaker
- Two rubber spatulas
- Four plastic moulds, eg empty small margarine tubs or small plastic bowls
- Rubber/nitrile gloves
- Eye protection – goggles
- Balance
- Heatproof container, eg 1 dm<sup>3</sup> beaker
- Two other containers for weighing the water and sodium hydroxide
- Grease for the moulds, eg small amount of the fat, oil spray or petroleum jelly
- Apron or labcoat
- Bunsen burner
- Heatproof mat
- Tripod and gauze
- 454 g dripping OR lard OR solid vegetable fat
- 57 g sodium hydroxide (**Corrosive**)
- 142 g water
- 5 g essential oil (optional).

#### What you do

1. Grease the moulds.
2. Weigh out the water into a container by placing the container on the scales and zeroing the balance. Pour in the water to the correct mass.
3. With great care, weigh out the sodium hydroxide in a separate container. Tip it into the water. Stir with a spatula. **Take care, as the solution gets hot and is very corrosive.**
4. Weigh out the fat. Put the fat into the heatproof container.
5. Melt the fat over a gentle heat. Take the temperature of the melted fat.
6. Allow the fat and the sodium hydroxide solution to cool until both are at about the same temperature in the range 45–60 °C. This takes about 10 minutes.
7. With great care, pour the sodium hydroxide solution into the fat and stir. Stir every few minutes until there is a change to a thick, white substance. This takes 30–50 minutes. The point when the mixture changes is called 'trace'. Test for 'trace' by lifting up the spatula and dripping the reaction mixture across the surface in the pan. If there is a trail, the reaction has reached 'trace'.
8. Add the essential oil, if using. Stir well.
9. Pour the soap into the greased moulds. Leave to set for 24 hours.
10. When the soap has set, remove the bars from the moulds. Place them on a tray and cover with a cloth. Leave the soap to 'cure' for four weeks before testing it for lathering ability and pH of solution. **DO NOT USE IT TO WASH WITH.**

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## Safety

Wear eye protection - goggles. Wear gloves.



## Questions

1. What are the reactants in the chemical reaction which makes soap?

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2. What happens at 'trace'?

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3. Why does it take so long to make soap?

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4. Why is sodium hydroxide not listed as an ingredient in soap, but is used in the reaction?

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