Activity 3

Perfume

Book References: Cleanliness, page 20; Chemistry, page 72; Commercial Chemistry, page 130.

People have enjoyed perfume for centuries. More than a thousand years ago, Muslims chose from a wide range of scents, thanks to the hard work of two talented chemists: al-Kindi (born 801, Iraq) and Jabir ibn Hayyan (born 722, Iraq). Al-Kindi created a vast number of 'recipes' for a wide range of perfumes, cosmetics and pharmaceuticals. Jabir ibn Hayyan – often known as the 'father of chemistry' – devised many techniques, including sublimation, crystallization, distillation, oxidation, evaporation and filtration, some of which were used to prepare the perfumes.

This activity introduces students to the Muslim world's perfume expertise before getting them to plan – and (optionally) produce – their own perfume from orange peel, using steam distillation. Also included are suggestions for testing their finished products.

Curriculum link

11-14	**QCA 7h – solutions** • Distillation can be used to separate a liquid from the solids that are dissolved in it • Distillation is a process in which evaporation of a liquid is followed by condensation

Learning objectives

Students will learn:

- How Muslim scientists developed the techniques to make – and the recipes for – a wide range of perfumes
- To devise a method to extract perfumed oil from orange peel

Running the activity

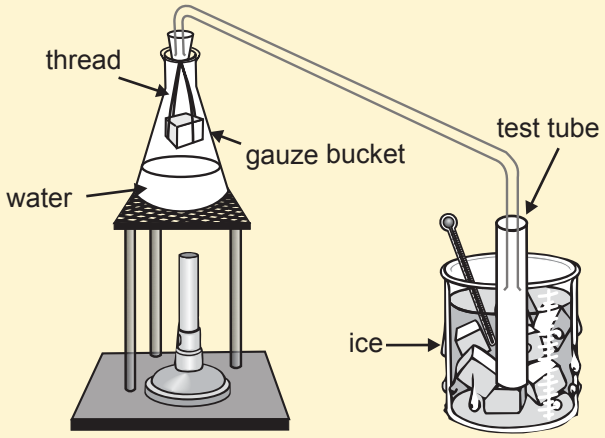
Starting the activity

Display **Activity 3a** (either projected or as an OHT). Ask small groups of students to discuss these questions: What's you favourite perfume? How does it make you feel? Why do people wear perfume? Then get students to speculate how long perfume-making has been around.

Running the main part of the activity

Display **Activity 3b**, and take students through the story of how al-Kindi and Jabir ibn Hayyan developed recipes for – and techniques to make – a wide range of different perfumes more than a thousand years ago.

Display **Activity 3c**, which sets the task: Can you create a scent using only the materials shown on the page? Tell small groups to use the chart on **Activity 3d** to help them plan their method (each group will need a copy of this page). If you wish, ask students to make their perfumes. This set-up for steam distillation works well.



Activity 3d describes optional tests to help students evaluate their perfumes, and includes space to record judgements and – if you wish – practical explanations for some of their findings.

Running the plenary

Discuss students' plans, products and tests. Emphasise that – in the Muslim world – chemists working twelve centuries ago had sophisticated techniques for making a wide range of perfumes and other pharmaceuticals.

Web links

http://www.healthy.net/scr/article.asp?id=1712
More information on the history of perfume and al-Kindi

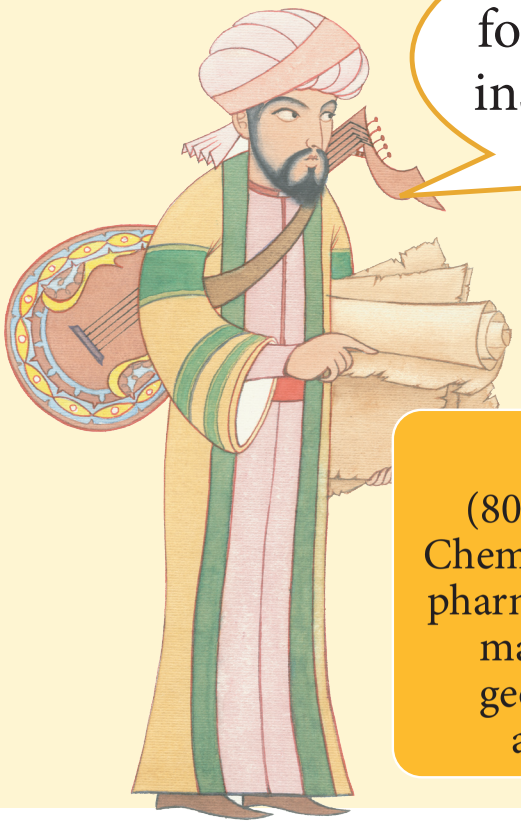
www.parfumsraffy.com/faqs.html
Commonly asked questions about perfumes.

www.guerlain.com
Discover your ideal fragrance.

- ***What's your favourite perfume?***
- ***How does it make you feel?***
- ***Why do people wear perfume?***

Making perfume is big business. But is it a new or ancient science?

- ***People have enjoyed perfume for centuries.***
- ***More than a thousand years ago, Muslims chose from an enormous range of scents, thanks mainly to two talented chemists.***



My book has 107 recipes for making perfume. I've included instructions for making medicines and fragrant oils, too.

al-Kindi
(801 – 873, Iraq).
Chemist, philosopher, pharmacist, physicist, mathematician, geographer and astronomer.

Jabir ibn Hayyan
(722 – 815, Iran).
Also called Geber – the 'founder of modern chemistry'.

But he couldn't have made them without the purification and distillation techniques that I devised!

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It's the year 850 in the Muslim world.

There's money to be made in perfume.

Use the chart to plan how to create a sensational scent.

You have only these materials:

- an orange
- a wooden tube
- a cork
- pieces of stick
- a flask
- a small piece of fabric
- ice
- water
- 2 candles
- a cup
- a thimble
- a knife
- thread or string

Sensational scent: creation

1

We need to heat water to make steam.

Let's draw how to use the equipment to do that.

2

Next we need to separate the scented oil from the orange peel.

How can we stop the peel falling into the water?

Let's surround the orange peel with steam. That should make the oil evaporate.

3

OK. So we'll get a mixture of steam and orange oil vapour.

We need to cool it down so it condenses into a liquid mixture.

4

We've got to collect the liquid somehow.

Right, and we need to separate the liquid oil from the water.

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Sensational scent: testing

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Have you produced a popular perfume? Will it sell? Place a few drops on filter paper and try these tests.

Name of perfume:

Classification	Judgement	Particle explanation
Is the scent ❋ Floral? ❋ Citrus? ❋ Herby? ❋ Fruity? ❋ Woody? ❋ Animal ?		
Character – does the perfume smell different after 15 minutes? If it does, it has character.		**Character** – why do some perfumes smell different after being heated longer by your skin?
Strength – how far away can you detect the scent?		**Strength** – why do particles from some perfumes travel further than others?
Volatility – how quickly does one drop evaporate? The quicker it evaporates, the more volatile it is.		**Volatility** – why do particles of some perfumes evaporate quicker than others?