

Introduction

Perfumes is a set of activities designed to teach separating techniques through a motivating context. It can be used in its entirety, or just dipped into. Students imagine they are on the writing team of a teen magazine, researching an article about perfumes by making or testing fragrance, and then writing about it. In this way, Perfumes provides opportunities to develop literacy skills.

There are 3 activities. The first two are aimed at pupils of all abilities. For each one, pupils do 'Research' on the topic (the experiment) and then 'Writing' (the article). The third activity - *Science of Smell* – is an extension.

Running the activities

Introduce the context with the 'welcome' sheet. You can copy this onto OHT. Pupils can then read the introductory article.

Activity 1 It makes scents.

Pupils can make their own fragrance by extracting the perfume oil from its raw materials. Two methods are given: grinding and filtering, and steam distillation. A briefing sheet is supplied giving details of both. The class could be divided into two, with one half doing each.

For the steam distillation, the best raw material to use is orange peel.

For the grinding and filtration, you could use lavender, rosepetals or other flowers, fruit, mint leaves, or kitchen spices. Water is given as the solvent on the sheet.

You could also try using ethanol as the solvent, which may work better.

The literacy activity is where pupils write their article. They explain the extraction process in a flowchart. An article template is provided. It is a 'why' writing frame, with sentence beginnings to help pupils use causal connectives like 'because'.

Activity 2. Perfume perfection

In this experiment, pupils devise and carry out tests on the properties of perfumes. They can compare their homemade scent with commercial brands, by bringing in their own fragrances (unwanted ones). The tests include smell, strength, volatility and residue. A briefing sheet is supplied. For some tests, pupils are encouraged to devise a simple procedure and a way of measuring results.

The literacy activity is where pupils write their article. They present their results by completing the article template. This writing frame gives sentence beginnings to help pupils express 'drawing conclusions', 'comparing', and 'causality'.

Activity 3. The science of smell

Pupils apply the ideas about the particle model to how we can smell perfume. It focuses on evaporation and diffusion. Information is supplied on a briefing sheet. Pupils write their article as a diagram, showing how particles travel from the bottle to the nose. They also explain the important science terms involved.

More ideas

- Get pupils to identify smelly substances in bottles as an introduction.
- Try using other fruits for steam distillation, like lemon, grapefruit or lime.
- Provide a way for pupils to take home their perfume safely e.g. a cotton ball dipped in fragrance as a drawer freshener.
- Pupils' articles for the magazine could form part of a Science Year newsletter from the school science department.
- The activities could lead to other investigations, such as 'Does opening a perfume bottle make a difference to how fast it evaporates?'

Learning outcomes

- distillation can be used to separate a mixture
- distillation is a process where evaporation of a liquid is followed by condensation
- apply the particle model of solids, liquids and gases to explain smelling perfume
- (literacy) construction of sentences using language to express causality, chronology, logic and comparison

Literacy

Science terms: solvent, filtration, distillation, evaporation, volatile, particle, diffusion

Prior learning

A basic understanding that all matter is made of particles.

Where the activity fits in

QCA Unit 7H Solutions, and unit 7G Particle model.

Skills

Investigative, communication, literacy

Careers

All the major activities on the CDROM have a Careers document with them.

Safety

- Pupils should wear eye protection for all the experiments, particularly for steam distillation
- Pupils should take sensible precautions when heating liquids
- Check that there are no hairline cracks in flasks being used for steam distillation
- Make sure the delivery tube is long enough to keep the test tube well away from the flame
- Pupils should be aware of 'suck back' possibility during distillation

Introduction

This explains the pupil sheets contained in the adapted versions that can be more accessible for students with special educational needs. It is recommended that they are referred to alongside the original teacher and technician notes. The principles used in creating these resources can easily be applied to worksheets and instructions in other areas of science teaching.

Running the activities

The Introduction sheet gives ideas of how animals and humans use the sense of smell. If students struggle with all the information on one sheet, then the statement cards on pages 2 and 3 can be used.

DIY Perfume Making 1

This explains the grinding and filtering experiment with step-by-step instructions including diagrams. The Sequencing Pictures on page 5 may be easier for some students to follow. They are intentionally not numbered or labelled so they could be cut up, laminated and used as a reinforcement activity.

DIY Perfume Making 2

Similar diagrammatic adaptations to the original materials have been made for the steam distillation experiment. Students must wear goggles in heating experiments and this is referred to in the instructions.

DIY Perfume – Method 1 and 2 sheets

These enable students to report on their experiment with a structured approach. Pencil icons indicate where students must write their answers and diagrams are included to help students focus on particular stages relevant to the question. These could be used in class or as a homework task.

Perfume Scientist Certificate

This provides the opportunity to positively reinforce success. A Word document version of this page has been included so that digital photographs of the students doing the practical can be inserted. The certificates could be displayed, taken home or included in a student's records.

Smelling Circus

This could be used as a starter or plenary activity in connection with other experiments or lessons relating to the senses and diffusion. Boiling tubes labelled 1 to 19 have different things placed inside them, most with a distinctive smell. Suggestions for the contents of the tubes are included in sheet 3. Masking tape is wrapped around the bottom section of each tube to prevent students from seeing what is inside and each tube needs a bung in the top.

Different versions of the recording sheet are in the resource file and the most appropriate version can be chosen. The correct way to smell samples should be demonstrated before the activity (using your hand to waft the smell towards your nose, starting at a cautious distance). The activity can be used to develop descriptive vocabulary and in relation to diffusion (how does the smell travel from the object to our noses?) or as a fun way to finish off the perfume investigations.

As with all these activities, you should be cautious of using them with students who do not have a sense of smell.