

2. The pastillator



2 hours

Based upon the extraction of lanolin from wool grease, the activities include testing immiscible liquids using oil and water and investigating the effects of adding detergent to produce emulsions which in turn reduce the efficiency of the separation of oil from water. Products containing lanolin can be manufactured in pastille form. The final activity in this section involves investigating techniques for producing pastilles and testing the effect of viscosity upon the pastilles produced.

OBJECTIVES

- To understand that it is important to test ideas using evidence from observation and measurement
- To understand that different liquids have different viscosities
- To discover variables that affect the size or shape of drops (pastilles) produced

RESOURCES

(Per group of 4 children unless otherwise stated)

- Activity sheet 2
- Devices for making drops, e.g. teaspoon, drinking straw, pipette, squeeze bottle from ketchup
- 2-3 liquids of differing viscosities, e.g. sunflower oil, bubble bath, liquid soap

ADVANCE PREPARATION

100 ml of each liquid in containers labelled 'Test liquid 1, 2 or 3'.

INTRODUCING THE ACTIVITY

Use the website area Fleece to Grease - Using Lanolin. The children watch the final stages of the production of lanolin and discover that lanolin can be mixed with other ingredients to make many products. They will see one of the processed lanolin products emerging in the form of pastilles from the pastillator. The lanolin product is runny when it enters the pastillator and falls through a mesh onto the conveyor in the form of drops called pastilles. The pastilles travel along the conveyor, cool, solidify and are bagged to be stored and used as an ingredient in manufacture.

The teacher reads the email on Activity sheet 2 which explains that Sumptuous Skincare Ltd is always seeking to improve the efficiency of its processes. Their scientists think that there may be a way to increase the number and speed of pastille production. They would like the children to investigate techniques for making drops, first using water and then two or three sample liquids, to investigate whether the runniness of liquids affects the quality or size of drops or the time taken for the drops to be made. They should also investigate whether the surface on which the drops land affects the size, shape or number of drops.

ACTIVITY

In their groups, the children discuss their ideas for techniques and equipment needed for making droplets of liquids. They test out their ideas using water and the resources they have suggested. The children are then shown the test liquids, samples 1-3, and asked to create and test their own methods for producing drops and recording their findings. They should be allowed time to observe the liquids before carrying out the activity. Each group could investigate a selection of its own or the following questions, depending upon the ability of the children:

How many ways can you find to make water drops?

Can you find a way to make the drops the same size each time?

Which method is easiest?

Which method would you recommend?

Does your method work as well with the sample liquids?

How can you make your test fair?

Are the drops always the same size/shape?

What happens when you drop the liquid from different heights?

Is it better to make the drops quickly or slowly?

Do the drops always stay the same shape?

How many drops can you make exactly the same size and shape?

Does a runny liquid or thick liquid make better drops?

What is the largest drop you can make?

If you change the surface on which the drops land, do the drops change in size or shape?

PLENARY

Each group reports its findings to the class². The teacher could collate the class results on the whiteboard, and lead discussions by asking some of the following questions:

Which technique for drop-making proved most effective?

Which method produced drops that could be replicated most easily?

What did they discover about the runniness or viscosity of the liquids and drops produced?

Did runniness affect drop quality or the number or shape of drops?

Was there an ideal runniness for producing drops?

What recommendations would they make to Sumptuous Skincare Ltd?

The children produce a report, poster or presentation containing their measurements, graphs, conclusions and recommendations for Sumptuous Skincare Ltd.

The teacher returns to the web page 'Lanolin Uses' in the Fleece to Grease section of the website where the children discover the wide variety of products containing lanolin, such as cosmetics, coatings and health care items.

EXTENSION ACTIVITY

The groups may like to design, make and test a device or system for producing many drops of the same size and shape in the quickest time possible.

AMBASSADOR ROLE

Ambassadors could support this activity by acting as experts, giving their opinion on the effectiveness, quality and originality of the different designs. They could also show the children samples of pastilles from their pastillator, large A3 photographs of parts of the machine in action, photographs of the operators and answer any questions the children may have.



I think the lessons are wonderfully explained. The resource list and suggested activities are fantastic and have really taught my children a lot about how to plan an investigation. They understand the nature of a fair test much better and understand what a 'variable' is. The website has also been a useful resource to engage the children and we have loved the idea of working with a local company.
(Year 6 teacher, N Yorks)

