

Mrs Johal's class

Mrs Johal has a problem – her class! They're very messy. Last week she had 3 jars – one with sawdust in, one with sand and a third one with salt. But now they're all mixed up – there is sand in the sawdust, there's salt in the sand and there's one jar with sand, sawdust and salt, all mixed up.

- Your task

How can Mrs Johal's class separate them?

Based on a suggestion by P. Borrows.

Time

60 minutes.

Group size

2-4.

Equipment & materials

Items from the 'junk' list (see 'In search of solutions' additional handout) – to encourage creativity.

General

Filter funnels, filter papers, hand lens, tweezers, sieve.

Per group

You will need to provide a mixture of sand/salt/sawdust – say about a yoghurt pot half full – for each group. For younger students, or those less experienced in investigations, it may be better just to do the sand/sawdust mixture or the sand/salt mixture. Access to water.

Health & Safety notes

This is an open-ended problem solving activity, so the guidance given here is necessarily incomplete. Teachers need to be particularly vigilant, and a higher degree of supervision is needed than in activities which have more closed outcomes. Students must be encouraged to take a responsible attitude towards safety, both their own and that of others. In planning an activity students should always include safety as a factor to be considered. Plans should be checked by the teacher before implementing them.

You must always comply with your employer's procedures and in some cases may decide that a particular activity is inappropriate in your situation. Further information on Health and Safety should be obtained from reputable sources such as CLEAPSS [<http://science.cleapss.org.uk>] in England, Wales and Northern Ireland and, in Scotland, SSERC [<https://www.sserc.org.uk>].

There are no significant hazards associated with this experiment.

It is the responsibility of the teacher to carry out a suitable risk assessment.

Curriculum links

Dissolving, evaporating, filtration, floaters/sinkers.

Possible approaches

Questions to ask students who need help are:- Do you think magnets should work? What about a sieve? A home-made sieve? Could you use tweezers and a hand lens to pick out the pieces? What about using water? – Floaters/sinkers, dissolving.

- Few students realise that only a small amount of water is needed to dissolve the salt. If a large amount of water is used it can take a long time to evaporate. The final drying of the salt and the sand can be done in an oven.

Extension work

Students could design a large scale separation plant that works continuously. Separate chocolate bits from chocolate chip cookies.

Credits

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Health & safety checked May 2018

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