

# Desert survival

Your aircraft has just crashed in the desert, and the last cupful of water has been spilled on the dry sand. You immediately scoop up the wet sand and put it into a plastic bag.

## - Your task

How can you get that vital water back? You have just 90 minutes before you die from dehydration....

Based on a suggestion by I. Carpenter.

## Age

12–13 years. (All abilities.)

## Time

90 minutes.

## Group size

2–3.

## Equipment & materials

### General

The following items are available from the wrecked aircraft, or its occupants: plastic bags, yoghurt pots, aluminium foil, aluminium foil trays, beer cans, plastic lemonade bottles, rubber bands, wire, string, old pair of tights, blocks of expanded polystyrene or foam rubber. Pliers, craft knives.

Furthermore, the desert environment provides unlimited quantities of sand, and a source of radiant energy – a lamp with a 60 W bulb should be provided to simulate the desert sun (check that it is safely wired and earthed). A stage floodlight would be exciting if available!

### Per group

A plastic bag containing 100 g sand mixed with 25 cm<sup>3</sup> water, *ie* wet sand.

## 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>].

Please consider the dangers of using water near electric mains.

There should be no need for eye protection; unless the separation method chosen takes an unusual turn.

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

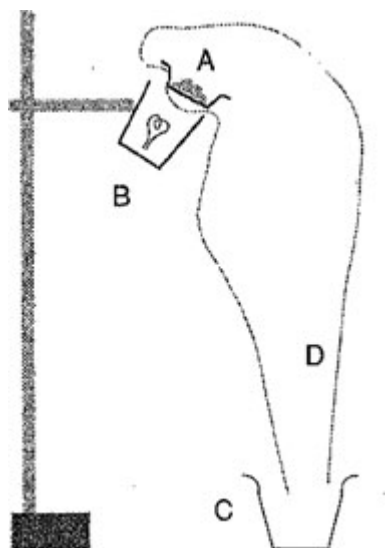
## Curriculum links

Evaporation, condensation.

## Possible approaches

Fits in well with classwork on evaporation and condensation. Some help on cooling steam may be necessary.

- A wide, clear plastic tube could "be provided, so that the principle of extraction of water using centrifugal force could be explored, *cf* spin dryer.
- Plastic dish covered in foil, inside dish, porous pot (sealed) containing wet sand. Bottom of dish insulated. At the top a lamp is shone on the dish.



A = Wet sand in aluminium dish

B = 60w bulb

C = Yoghurt pot

D = Plastic bag set at an angle

## Suggested write-up

Taped interviews conducted with the 'survivors' of the aircrash on their return to the UK by science reporters. The novel water 'extractors' already making headline news need the students' personalised explanations.

## Evaluation of solution

These are suggestions only:

- 1 Just before they are about to die, the 'survivors' (groups) present the judges with the water they have freed from the sand.
- 2 The judges will measure the volume of water collected. The winning group is that with the largest volume of water.
- 3 In the event of a tie, the group with the most appetising sample of water will be declared the winners.

## Extension work

Cross-curricular possibilities with the geography department – *ie* water supply in desert regions.

## Credits

© Royal Society of Chemistry

*Health & safety checked May 2018*

Page last updated October 2018