

# After meal puzzle

## Time

15 min.

## Curriculum links

A knowledge of freezing point depression in solutions is helpful but not essential.

## Group size

1–2.

## Materials and equipment

### Materials per group

- ice cubes
- water
- common salt (NaCl).

### Equipment per group

- glass tumbler
- plastic cup or beaker
- 10 cm of string.

## Safety

There are no particular safety issues.

## Risk assessment

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

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/>].

## Commentary

This simple puzzle is based on an experiment in a book called *After dinner science*.<sup>1</sup> It might be a memorable way of introducing the depression of freezing point.

## Procedure

The problem can be solved by first soaking the end of the string in the water. The end is then laid across the top of the ice cube and a little salt is sprinkled along each side of the string. The salt lowers the freezing point of the ice that it touches, causing it to melt. The heat needed to melt the ice is

withdrawn from the adjacent ice and from the water on the string. Within seconds the string should become frozen to the ice cube so that it can be lifted up.

## **Extension**

Do other soluble substances – eg sugar and ‘low salt’ – work as well as common salt?

## **Reference**

1. K. Swezey, *After dinner science*. London: Nicholas Kaye, 1949.

## **Credits**

© Royal Society of Chemistry

*Health & safety checked May 2018*

Page last updated October 2018