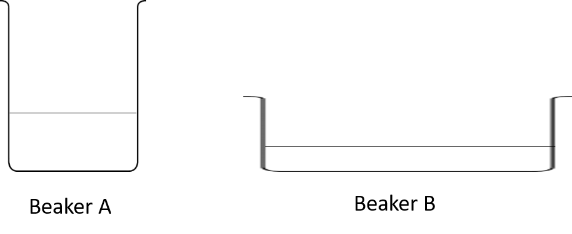
**Surface area**

10cm3 of water is added to two different shapes of beaker.



**Predict**

From which beaker will the water completely evaporate first?

Write down your **prediction**.

**Explain**

Write down the thinking behind your prediction.

**Observe**

Describe what happens.

**Explain**

Were your prediction and explanation correct?

If not, can you explain what you observed?

*Chemistry > Big idea CPS: Particles and structure Topic CPS5: Evaporation > Key concept CPS5.1: Explaining evaporation*

|  |
| --- |
| **Response activity** |
| **Surface area** |

**Overview**

|  |  |
| --- | --- |
| Learning objective: | Evaporation takes place at any temperature between melting and boiling point. |
| Observable learning outcome: | Describe where in a liquid evaporation takes place. |
| Activity type: | Response, predict, explain, observe, explain |
| Key words: | evaporation, surface area |

This activity can help develop students’ understanding by addressing the misunderstandings revealed by the following diagnostic question:

* Location of evaporation

**What does the research say?**

As part of their research Coştu and Ayas (2005) presented situations to students through a series of short experiments. They then used questioning to discover more about students’ understanding.

One question used was “Does evaporation take place on the surface of the alcohol or in all parts of it? Why?”

A few students correctly explained that particles left from the surface of the liquid. All those that were identified to hold a “specific misconception” were found to think that evaporation occurs in all parts of a liquid.

**Ways to use this activity**

Students should complete this activity in pairs or small groups, and the focus should be on the discussions. It is through the discussions that students can check their understanding and rehearse their explanations.

To begin, each group should discuss the activity and use their scientific understanding, firstly to predict *what* they think will happen, and then to explain *why* they think they are going to be right. If students in any group cannot agree, you may be able to direct them with some careful questioning.

Usually students would now carry out the practical or watch a demonstration. However, as this experiment takes times, images of the results have been provided on the PowerPoint.

After the practical each group should be given the opportunity to change or improve their explanation. A good way to review your students’ thinking might be through a structured class discussion. You could ask several groups for their *explanations* and put these on the whiteboard. Then ask other groups to suggest which explanation is the most accurate and the most clearly expressed, and through careful questioning work up a clear ‘class explanation’.

A useful follow up is for individual students to then write down explanations in their own words – without reference to the class explanation on the board (i.e. cover it up).

*Differentiation*

The quality of the discussions can be improved with a careful selection of groups; or by allocating specific roles to students in each group. For example, you may choose to select a student with strong prior knowledge as a scribe. They may question the others and only write down what they have been told. This strategy encourages contributions from more members of each group.

**Expected answers**

The water in beaker B will evaporate first. Evaporation occurs at the surface. The water in beaker B is more spread out and has a greater surface area. This means that more of the water is able to evaporate at any one time resulting in a faster rate of evaporation.

**Acknowledgments**

Developed by Helen Harden (UYSEG).

Images: Helen Harden and Alistair Moore (UYSEG)

**References**

Coştu, B. and Ayas, A. ş. a. (2005). Evaporation in different liquids, secondary students' conceptions. *Research in Science and Technological Education,* 23(1)**,** 75-97.