**Garden problem**

It is winter. The bird bath in the school garden needs refilling.



Some primary children discuss whether evaporation could be the reason that the bird bath is empty.

**Archie:** In the summer the temperature is hotter than the water, so it evaporates. The water cannot have evaporated in winter.

**Ollie:** I think the water can still dry up in the winter because there are still sunny days.

**Bailey:** In the summer the bird bath dries up in the sun, but the sunlight is not powerful enough in winter.

**Lucy:** I think the water can evaporate, even if the weather is cold.

1. Who do you agree with and why?

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| Cards for  **Garden problem** |  |
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| **Bailey:** In the summer the bird bath dries up in the sun, but the sunlight is not powerful enough in winter. | **Lucy:** I think the water can still evaporate, even if the weather is cold. |

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

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| **Response activity** |
| **Garden problem** |

**Overview**

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| Learning objective: | Evaporation takes place at any temperature between melting and boiling point. |
| Observable learning outcome: | Predict that evaporation will occur in liquids with a temperature that is less than or greater than that of the surroundings. |
| Activity type: | Response, talking heads |
| Key words: | evaporation, temperature |

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

* Evaporating temperatures

**What does the research say?**

Research (Coştu and Ayas, 2005) found that some students thought that heating was necessary for evaporation to take place. The process of evaporation was therefore linked to a temperature difference between the liquid and the surroundings. According to these students, if the temperature of the surroundings was higher than the temperature of the liquid then evaporation would take place, but otherwise it would not.

**Ways to use this activity**

Students should complete this activity in pairs or small groups, and the focus should be on the discussions. The statements are also provided as cut-out cards for students to physically organise.

If there is disagreement when you take feedback, a good way to progress might be through structured class discussion. Ask one student to explain why they gave the answer they did; ask another student to explain why they agree with them; ask another to explain why they disagree, and so on. This sort of discussion gives students the opportunity to explore their thinking and for you to really understand their learning needs.

*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**

Lucy is scientifically correct. Water can evaporate, even if it is cold.

**Acknowledgments**

Developed by Helen Harden (UYSEG).

Images: Helen Harden

**References**

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