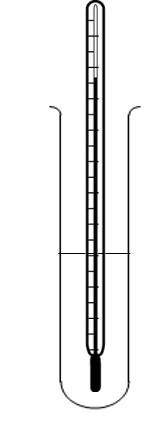
**Endothermic reaction**



During an endothermic reaction, the temperature of the chemicals in the test tube decreases.

When the reaction has finished, the test tube contains the products of the reaction any unreacted reactant and water (if the chemicals are in solution).

The chemicals then gradually warm until they are at the same temperature as the surroundings.

What is going on?

*Fill in the gaps to explain what happens when the chemicals warm.*

*You should only use the words* ***temperature*** *and* ***energy****.*

An endothermic reaction takes in \_\_\_\_\_\_ from the chemicals in the test tube. This makes the particles move more slowly. The chemicals now have a lower \_\_\_\_\_\_\_\_\_\_\_.

Some particles that make up the air collide with the chemical particles and make them move faster. \_\_\_\_\_\_\_\_\_\_\_ is transferred from the surrounding air to the chemicals. Gaining \_\_\_\_\_\_\_\_\_\_\_ means the \_\_\_\_\_\_\_\_\_\_\_ of the chemicals goes up.

Eventually the \_\_\_\_\_\_\_\_\_\_\_ of the chemicals is the same as the surrounding air. \_\_\_\_\_\_ has been transferred from the surroundings.

*Chemistry > Big idea CCR: Chemical reaction> Topic CCR3: Energy and reactions > Key concept CCR3.1: Exothermic and endothermic reactions*

|  |
| --- |
| **Response activity** |
| **Endothermic reaction** |

**Overview**

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| --- | --- |
| Learning objective: | During a chemical reaction energy may be transferred to or from the surroundings. |
| Observable learning outcome: | Describe how the temperature of the chemicals will change with time after an endothermic reaction. |
| Activity type: | Response, focused cloze |
| Key words: | temperature, energy, endothermic |

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

* Temperature change 2

|  |  |
| --- | --- |
| **P** | **PRIOR UNDERSTANDING**  This activity explores ideas from an earlier key concept (PMA1.2), to aid transition from earlier stages of learning. |

**What does the research say?**

Research (Erickson and Tiberghien, 1985) found that student explanations differ from the scientific explanation because they do not always take into account all the systems which are interacting. For example, in this case students need to consider the surrounding air (and its temperature) as well as the reaction system. In order to correctly predict and explain the change in temperature of the chemicals students need to recognise the temperature difference between the reaction system and the surroundings. They also need to recall that energy will move spontaneously from the surroundings (which are at a higher temperature) to the object (the reaction system) which is at a lower temperature.

**Ways to use this activity**

The activity provides an opportunity to re-teach a challenging concept and to allow students to practise correct use of the words ‘energy’ and ‘temperature’.

**Expected answers**

An endothermic reaction takes in **energy** from these chemicals. This makes the particles move more slowly. The chemicals now have a lower **temperature**.

Some particles that make up the air collide with the chemical particles and make them move faster. **Energy** is transferred from the surrounding air to the chemicals. Gaining **energy** means the **temperature** of the chemicals goes up.

Eventually the **temperature** of the chemicals is the same as the surrounding air. **Energy** has been transferred from the surroundings.

**Acknowledgments**

Developed by Helen Harden (UYSEG) from an original idea by Peter Fairhurst (UYSEG).

Images: Helen Harden and Alistair Moore

**References**

Erickson, G. and Tiberghien, A. (1985). Heat and Temperature. In Driver, R., Guesne, E. & Tiberghien, A. (eds.) *Children's Ideas in Science.* Milton Keynes and Philadelphia: Open University Press.