**Magnesium powder**

A small amount of magnesium powder is added to a test tube containing copper sulfate solution.

The temperature of the chemicals inside the test tube increases.

Put a tick (✓) in the box next to the sentence about energy that you think is best.

|  |  |  |
| --- | --- | --- |
| **A** | The chemical reaction releases energy stored in the magnesium. |  |
|  |  |  |
| **B** | The chemical reaction uses up energy stored in the reactants. |  |
|  |  |  |
| **C** | The chemical reaction transfers energy to the surroundings. |  |
|  |  |  |
| **D** | The chemical reaction between magnesium and copper sulfate makes energy. |  |

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

|  |
| --- |
| **Response activity** |
| **Magnesium powder** |

**Overview**

|  |  |
| --- | --- |
| Learning objective: | During a chemical reaction energy may be transferred to or from the surroundings. |
| Observable learning outcome: | Recognise that energy is conserved during exothermic reactions. |
| Activity type: | Diagnostic, application and practice |
| Key words: | energy |

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

* Burning fuel

**What does the research say?**

Research into chemistry misconceptions by Kind (2004) found that the phrase ‘fuels contain energy’ can lead some students to think that energy is stored in a fuel and released when it burns. Use of language in everyday life such as ‘energy running out’ can suggest to students that energy can be ‘used up’. Other misunderstandings about burning were found to lead to the misconception that burning creates energy. Both of these contradict the important idea of conservation of energy.

**Ways to use this activity**

This activity deliberately uses a chemical reaction that is not met in day to day life. This is to remove some of the preconceptions linked with the burning of a fuel.

This activity gives students the opportunity to practise applying their understanding and to clarify their thinking through discussion. To support this, students should answer the question in pairs or small groups.

Listening to individual groups as they work often highlights any difficulties they might have. These can often be overcome, through a whole class clarification or redirection part way through the activity.

Asking students to share their answer is a useful check. After a group has fed back, it might be helpful to model an even better answer. You could do this, for example, by asking another group to add to, or clarify, the first observation.

*Differentiation*

It may help some students if the experiment is demonstrated.

Practical work should be carried out in accordance with local health and safety requirements, guidance from manufacturers and suppliers, and guidance available from CLEAPSS.

Practical guidance which includes this reaction may be found at <http://www.rsc.org/learn-chemistry/resource/res00000406/exothermic-or-endothermic?cmpid=CMP00005103>

**Expected answers**

C

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Images: None

**References**

Kind, V. (2004). Beyond appearances: Students' misconceptions about basic chemical ideas. [Online]. Available at: <http://www.rsc.org/learn-chemistry/resource/res00002202/beyond-appearances?cmpid=CMP00007478>.