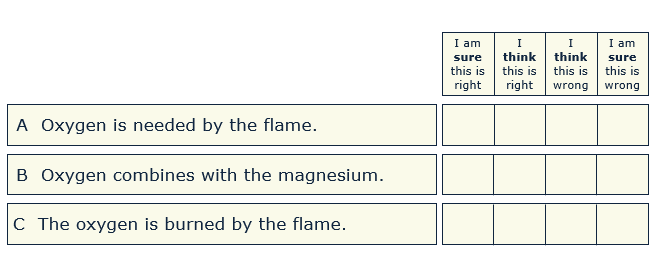
**Oxygen needs**

1. Some magnesium is held (using tongs) in a Bunsen burner flame.

It burns with a bright white flame.

**Never** look directly at the flame.

What is the role of oxygen in this chemical reaction?

*Read these statements. For each statement, tick (✓)* ***one*** *column to show what you think about it.*

*Chemistry > Big idea CCR: Chemical reactions > Topic CCR2: Understanding reactions > Key concept CCR2.2: Combustion*

|  |
| --- |
| **Diagnostic question** |
| **Oxygen need** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | During combustion new products are formed from the combination of oxygen with the fuel, resulting in an increase in measured mass. |
| Observable learning outcome: | Recognise that the burning of a metal involves combination with oxygen. |
| Question type: | confidence grid |
| Key words: | combustion, oxygen |

**What does the research say?**

Children’s Ideas in Science (Driver, Guesne and Tiberghien, 1985) describes research which found that whilst about a third of the 11-12 year olds in the study indicated an appreciation that oxygen is needed for burning their explanations for this varied. The explanations included misunderstandings such as “the fire needs oxygen to eat it away” and “the fire likes air”.

Research of ideas of secondary students in New Zealand found that the majority of students did recognise the need for oxygen in burning but many did not regard it as being actively involved.

Students appeared to have difficult in appreciating that burning involves combination with oxygen.

**Ways to use this question**

Students should complete the confidence grid individually. This could be a pencil and paper exercise, or you could use an electronic ‘voting system’ or mini white boards and the PowerPoint presentation.

If there is a range of answers, you may choose to respond 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.

**Expected answers**

The correct answer that students should be sure is right is “oxygen combines with the magnesium”.

The other answers are incorrect.

**How to respond - what next?**

A student who indicates confidence option A may have recalled that oxygen is required for burning but may be unsure why this is. A student who is confident that C is correct may not understand that the burning of magnesium is actually a chemical reaction involving two reactants.

If students have misunderstandings about why oxygen is needed for burning, it may help to revisit the idea of oxidation being a combination of elements (see key concept: 1.1: Formation of new substance). Students could then be asked to apply this scientific thinking to a new situation.

The following BEST ‘response activities’ could be used in follow-up to this diagnostic question:

* Does it burn?

**Acknowledgments**

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Images: None

**References**

Driver, R., Guesne, E. and Tiberghien, A. (1985). *Children's Ideas in Science,* Milton Keynes, UK: Open University Press.