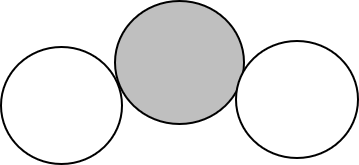
**Formula choice**

1. The diagram below shows a molecule that is made up of three atoms.

sulfur atom



oxygen atom

oxygen atom

Which chemical formula should be used to represent the molecule?

A OSO

B SO2

C SO2

D S2O

*Chemistry > Big idea CPS: Particles and structure > Topic CPS2: Elements and compounds > Key concept CPS2.2: Symbols and formulae*

|  |
| --- |
| **Diagnostic question** |
| **Formula choice** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | A chemical formula provides information on the composition of a substance. |
| Observable learning outcome: | Select an appropriate chemical formula for a given, simple, molecule. |
| Question type: | simple multiple choice |
| Key words: | atom, molecule, formula |

**What does the research say?**

A review of empirical research (Taskin and Bernholt, 2012) describes different ways in which students were found to interpret chemical formulae. Some students assumed that a chemical formula provided a code for the order of connections within a substance. This meant that some students also thought that HS and SH were different substances. Other students linked the subscript numbers to the subsequent element rather than the preceding one.

**Ways to use this question**

Students should complete the question 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.

The answers to the question will show you whether students understood the concept sufficiently well to apply it correctly.

It may also be beneficial to ask students to explain why the other options are incorrect.

**Expected answers**

C

**How to respond - what next?**

A student selecting option A may think that the formula should show the order in which atoms are connected. Option B incorrectly uses notation familiar from mathematics, with the figure 2 placed as if a power. A student choosing option D may be confused about where the subscript number should be placed.

If students have misunderstandings about how to write the chemical formula of a given molecule they may require further teaching and consolidation with further practice.

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

* Formula practice

**Acknowledgments**

Developed by Helen Harden (UYSEG).

Images: Helen Harden

**References**

Taskin, V. and Bernholt, S. (2012). Students' understanding of chemical formulae: A review of empirical research. *International Journal of Science Education,* 36(1)**,** 157-185.