**Possible products**

1. The formula of zinc carbonate is ZnCO3. If heated, zinc carbonate decomposes (breaks apart) making two products.
   1. For each pair of products, state whether they are possible or impossible. Give reasons for each answer.

A CuO + CO2

B Zn + CO3

C ZnC + O2

* 1. Write down the formula of the two actual products of this reaction.

*Chemistry > Big idea CPS: Particles and structure > Topic CPS3: Chemical change > Key concept CPS3.1: Rearrangement of atoms*

|  |
| --- |
| **Response activity** |
| **Possible products** |

**Overview**

|  |  |
| --- | --- |
| Learning objective: | During a chemical reaction, atoms are rearranged and a new substance (or substances) are formed with different properties. |
| Observable learning outcome: | Use a chemical formula to predict possible products of a thermal decomposition reaction. |
| Activity type: | Application and practice |
| Key words: | Formula, thermal decomposition |

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

* Formula help

**What does the research say?**

A research study (Al-Kunifed, Good and Wandersee, 1993) found that many students’ misunderstandings about chemical formulae related to previous every day and mathematical experience.

A chemical symbol was interpreted by some students in the same terms as a symbol met in day-to-day life. These students perceived a chemical formula to be an abbreviation used because it would take chemists ‘too long to write out the words’.

Other students thought that only compounds have a formula (and hence that O2 was not a formula).

If students are struggling to interpret the chemical formulae, they may benefit from revisiting key concept 2.2: Symbols and formulae.

**Ways to use this activity**

Students should be encouraged to focus on what products are possible in terms of the number of atoms in the reactants. It should be made clear that although a pair of products may be theoretically possible this may not be what is actually produced.

*Differentiation*

If some students are working with a teaching assistant, then a list of prompt questions for the teaching assistant could help to make this activity more purposeful.

**Expected answers**

1a

A Impossible. A new Cu atom cannot be created if there were no Cu atoms to start with.

B Possible. The correct number of atoms are present.

C Impossible. An O atom cannot be lost during the reaction.

b ZnO and CO2

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Images: None

**References**

Al-Kunifed, A., Good, R. and Wandersee, J. (1993). Investigation of high school chemistry students' concepts of chemical symbol, formula and equations: Students' prescientific conceptions. ERIC Document ED376020.