

## Decomposition reactions

### Learning objectives

- 1 Identify decomposition reactions from a word equation or symbol equation.
- 2 Use the law of conservation of mass to balance simple decomposition reactions.

### Introduction

Decomposition reactions are a key part of our everyday lives. The decomposition of hydrogen peroxide is responsible for bleaching hair, cleaning bathrooms and making paper white, while the decomposition of sodium hydrogen carbonate (baking soda) makes cakes rise and puts the bubbles in honeycomb.

Scientists are even looking to decomposition reactions to provide alternatives to fossil fuels, with the decomposition of water providing a cleaner source of energy for hydrogen-fuelled vehicles.

This worksheet will help you to discover what you know about these useful chemical reactions.

### Questions

1. What is meant by a decomposition reaction?

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2. Consider the following word equation for a thermal decomposition reaction:



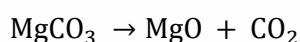
(a) State if each substance is an element, compound or mixture.

- i. Lead carbonate is \_\_\_\_\_.
- ii. Lead oxide is \_\_\_\_\_.
- iii. Carbon dioxide is \_\_\_\_\_.

(b) State if each substance is a reactant or a product.

- i. Lead carbonate is a \_\_\_\_\_.
- ii. Lead oxide is a \_\_\_\_\_.
- iii. Carbon dioxide is a \_\_\_\_\_.

3. Consider the following symbol equation for a thermal decomposition reaction:



(a) State the name of the reactant and two products.

- i. The reactant is \_\_\_\_\_.
- ii. The products are \_\_\_\_\_ and \_\_\_\_\_.

(b) How do you know this is a thermal decomposition reaction?

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(c) Is this equation balanced? How do you know?

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(d) If 18.5 grams of  $\text{MgCO}_3$  were heated to a very high temperature and fully decomposed and 9.6 grams of  $\text{MgO}$  were left at the end of the reaction, how much  $\text{CO}_2$  was produced? Explain your answer.

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4. (a) State the word equation for the thermal decomposition of copper carbonate.

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(b) State the symbol equation for the thermal decomposition of copper carbonate.

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(c) Is your equation balanced? How do you know?

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**Challenge**

5. Mercury(II) oxide ( $\text{HgO}$ ) decomposes if it is exposed to light or heated above  $500^\circ\text{C}$ .

(a) What are the names of the products formed?

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(b) Write the word equation for this decomposition.

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(c) What are the formulas of the products formed?

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(d) Write a balanced symbol equation for this reaction.

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(e) How do you know your equation is balanced?

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