STUDENT SHEET 📄 🔂 🔂 😭

Reaching dynamic equilibrium: storyboard

Learning objectives

- 1 State what a reversible reaction is.
- 2 Describe how a reversible chemical reaction reaches dynamic equilibrium.

Introduction

Most chemical reactions you have studied so far are **irreversible**, where the reaction only takes place in one direction.

However, many chemical reactions are **reversible**: the products can react together to reform the original reactants. The **forwards reaction** and the **reverse reaction** are both occurring.

In **dynamic equilibrium**, the forwards reaction and reverse reaction occur at **the same rate** in a **closed system**. The **concentrations** of substances at equilibrium are **constant**, they are not changing.

Equilibrium is an important process in industry. To make reversible reactions as **efficient and sustainable** as possible, manufacturers need to understand equilibrium. Because the **equilibrium position** – the concentrations of substances present at equilibrium – affects the **yield** of the product.

True or false? Checking understanding

Q.	Statement	True or false?
1.	Combustion is an example of an irreversible reaction.	
2.	The symbol for a reversible reaction is \rightarrow .	
3.	Products must be allowed to leave the flask in a reversible reaction.	
4.	A reversible reaction can only reach dynamic equilibrium in a closed system.	
5.	A reaction at equilibrium has stopped.	
6.	At equilibrium, the rate of the forwards reaction is equal to the rate of the reverse reaction.	
7.	If a reaction is at equilibrium, it means that all reactants have been fully converted into products.	
8.	A system at equilibrium will show measurable changes in the concentrations of reactants and products over time.	
9.	If the forwards reaction is exothermic, then the reverse reaction will be endothermic.	

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Instructions

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Create a storyboard to describe how a chemical reaction reaches dynamic equilibrium. A storyboard contains an illustration and a short section of text underneath to describe what is happening in the picture. The storyboard shows a sequence of events.

What does a storyboard look like?

Use the table to show how the stages progress:

1	2	3	4
5	6	7	8

Complete the activity on the storyboard sheet. Follow the instructions below to write a short description then draw or choose an appropriate illustration above the description.

- 1. Describe a common example of an irreversible reaction.
- 2. Explain what a reversible reaction is and write an example of one.

HINT: you may use letters to represent chemicals eg A, B, C and D.

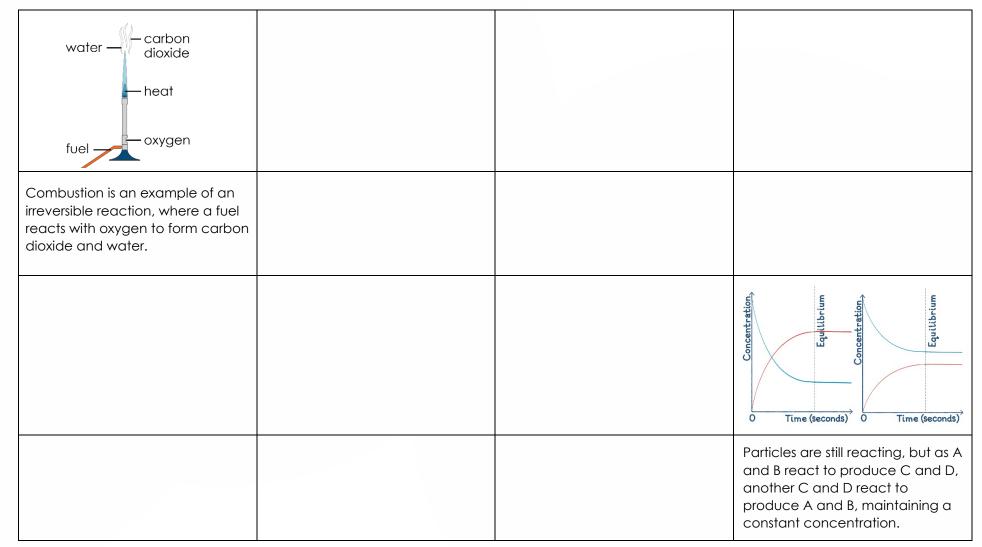
- 3. Describe what is meant by the forwards and reverse reaction. Write equations for these in the space for the illustration.
- 4. State whether dynamic equilibrium needs an open or closed system.
- 5. Discuss the concentrations of substances and rate of the forwards reaction at the beginning.
- 6. Discuss how the concentrations of substances and the rates of the forwards and reverse reaction change during the reaction.
- 7. Describe what happens to the rates of the forwards and backwards reaction when equilibrium is reached. Sketch a graph to show how the rates of the forwards and reverse reaction change with time.
- Describe what happens to the concentrations of substances as equilibrium is reached. Sketch a graph to show how concentrations change from the beginning of the reaction to equilibrium being reached.

Education in Chemistry 14–16 years



Downloaded from rsc.li/4bcqPZI

Complete the storyboard to show how equilibrium is reached. Use the numbered prompts and/or the keywords for support.





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Support

Use these images to complete the storyboard. You will need to put them into the correct order in the sequence.

