Stage 2

Interpreting graphs

ROYAL SOCIETY OF CHEMISTRY

Education
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Introduction

The purpose of these activities is to interpret the line of best fit on a graph.

Learning objectives

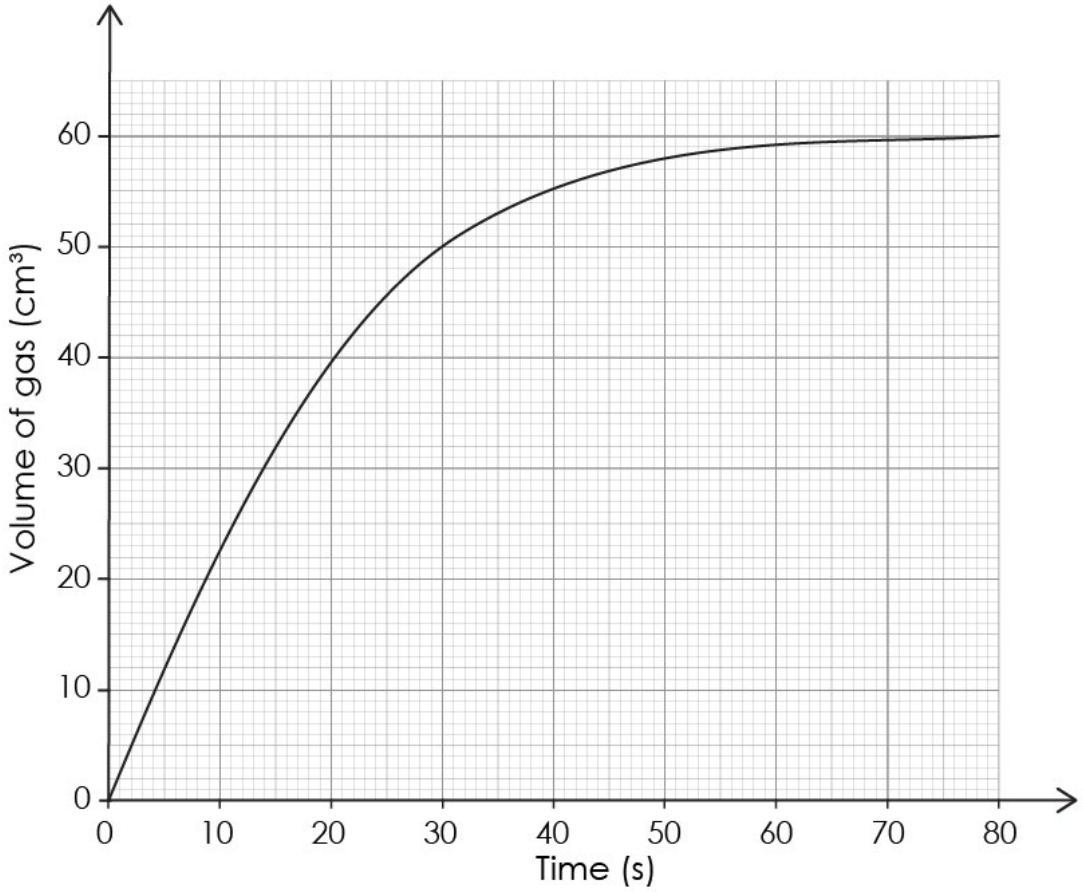
1. Describe the overall trend or pattern in the data.
2. Describe any significant differences from the overall trend or pattern.
3. Explain the trend or pattern in the data.

Describing the overall trend

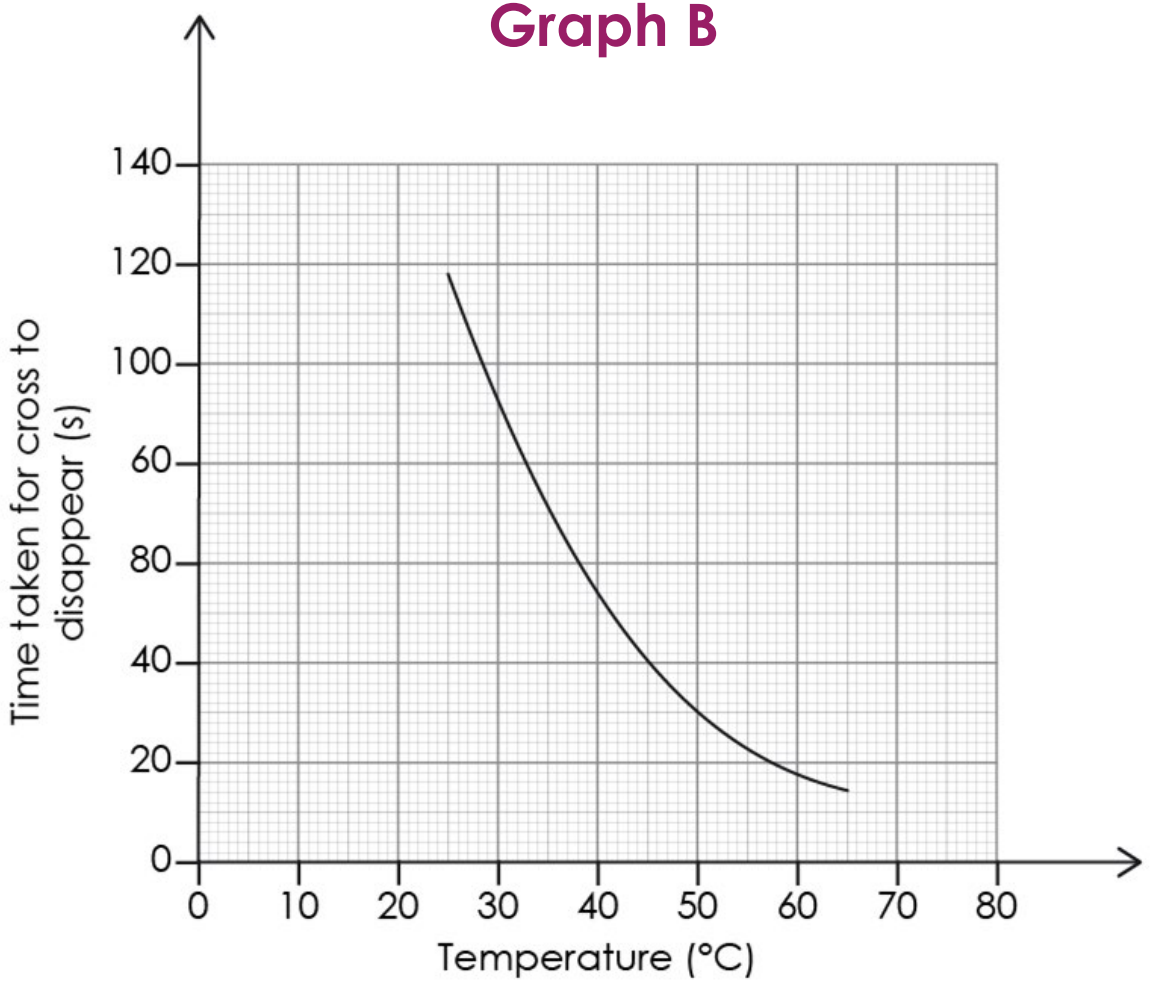
Activity

Describe the overall trend in each of the following graphs:

Graph A



Graph B



Describing the overall trend – answer

Graph A: The rate of reaction decreases over time. The gradient of the slope becomes less steep.

Graph B: As the temperature increases the time taken for the cross to disappear decreases (the rate of reaction increases).

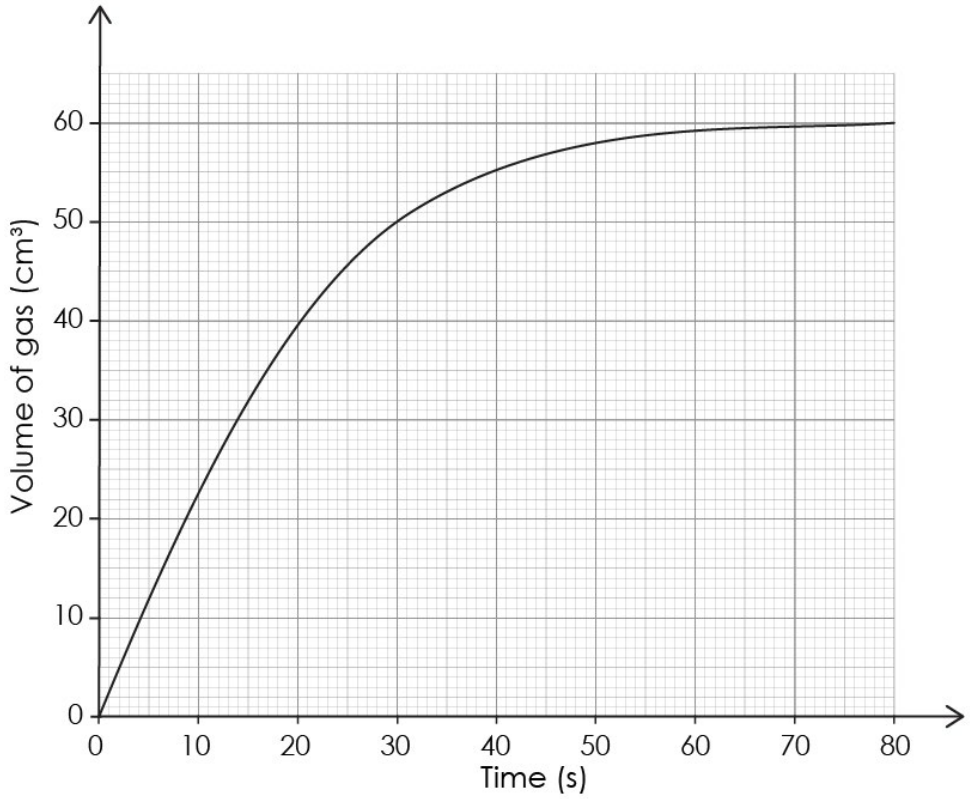
Answer

Describing a graph

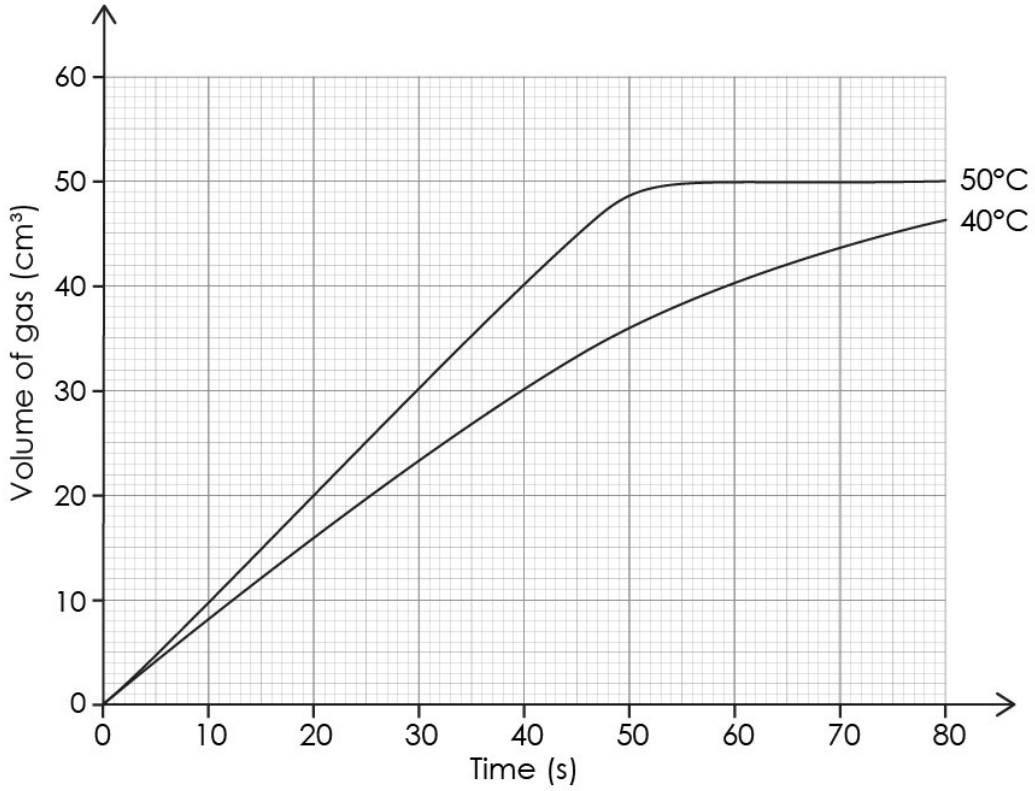
Activity

Describe, in detail, the trends for each of the following graphs:

Graph A



Graph B



Describing a graph – answer

Answer

Graph A: The volume of gas produced in each time interval decreases. The initial rate of reaction between 0 and 15 seconds is fast. This slows down between 15 seconds and 55 seconds. The reaction stops at approximately 59 seconds.

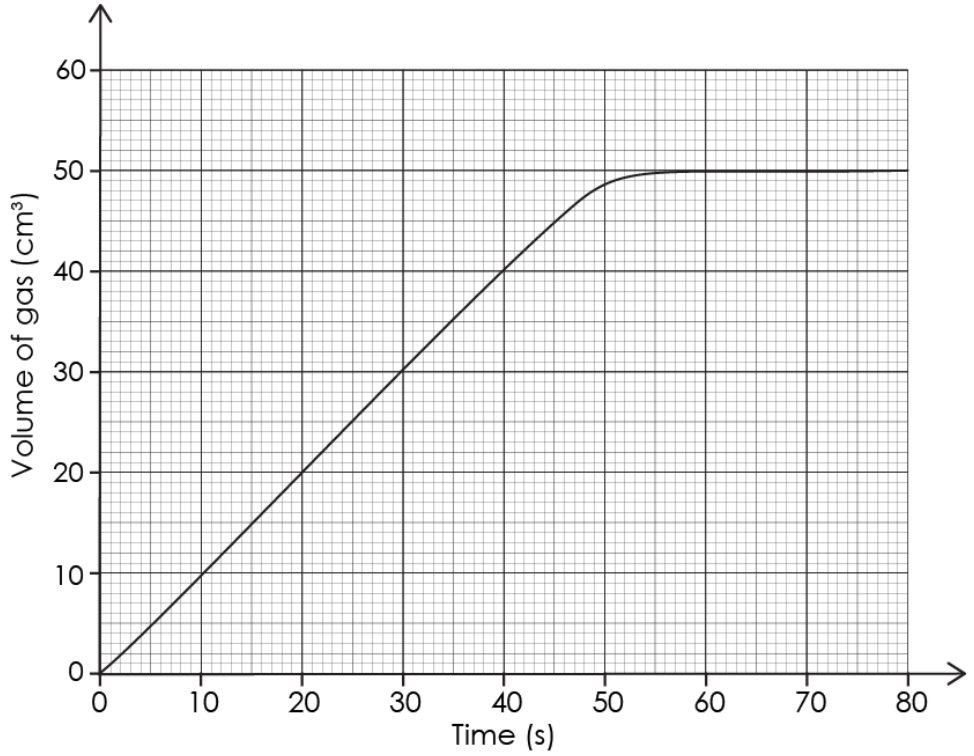
Graph B: As temperature increases, the rate of reaction increases. At 50°C the reaction stops after approximately 55 seconds.

Explaining the trends

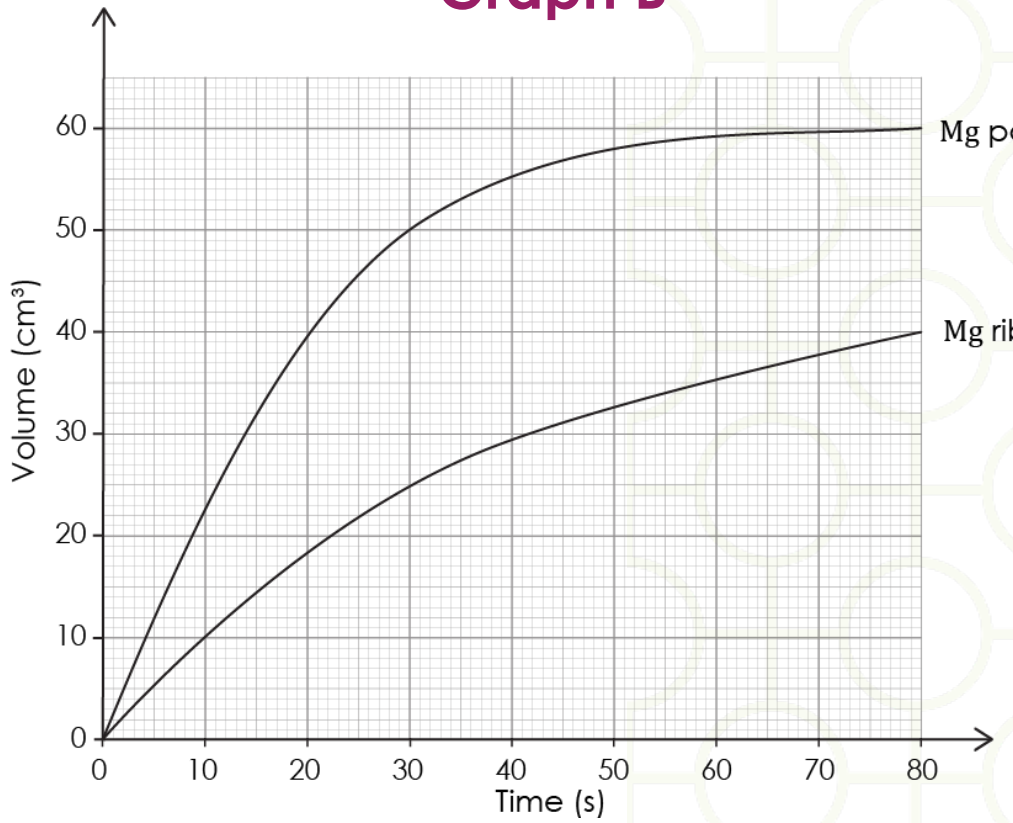
Activity

Explain the trends in the following graphs where excess magnesium is reacting with 1 mol/dm^3 hydrochloric acid:

Graph A



Graph B



Explaining the trends – answer

Answer

Graph A: The rate of reaction is at its fastest between 0 and approximately 45 seconds. After 45 seconds the reaction slows down as the concentration of HCl decreases because there are fewer successful collisions between particles. The reaction stops at 55 seconds as the HCl has run out; it is the limiting factor.

Graph B: The rate of reaction for magnesium powder is greater than the rate for magnesium ribbon because magnesium powder has a greater surface area, allowing more frequent successful collisions.