



Interpreting graphs

This set of short activities forms part of the Maths skills for chemistry resources series which can be viewed at: rsc.li/4A41ezG. The resource series covers mathematical skills which are fundamental to chemistry teaching:

- **Graphs and data**, divided into:
 - Creating graphs
 - **Interpreting graphs**
- Ratio and proportion
- Understanding number, divided into:
 - Unit conversion
 - Significant figures and rounding
- Algebra and equations

Resource series components

The resource series is divided into two stages. Stage 1 (★) is most suitable for ages 11–14 and stage 2 (★★) for ages 14–16. However, older learners with gaps in their fundamental knowledge can use stage 1 as a stepping stone.

Stage 1 ★ Relationship between variables Use this worksheet to help students to understand the relationship between the variables in these examples: - positive linear relationships - negative linear relationships - no relationship Teacher-led presentation (★)	Using data A scientist investigating the reaction between calcium carbonate chips and hydrochloric acid. They produce a graph that contains the results in copying a table and a line of best fit, and on the right, a table. <table><thead><tr><th>Time (s)</th><th>Volume (cm³)</th></tr></thead><tbody><tr><td>0</td><td>0</td></tr><tr><td>5</td><td>15</td></tr><tr><td>10</td><td>30</td></tr><tr><td>15</td><td>45</td></tr><tr><td>20</td><td>60</td></tr><tr><td>25</td><td>75</td></tr><tr><td>30</td><td>90</td></tr><tr><td>35</td><td>105</td></tr><tr><td>40</td><td>120</td></tr><tr><td>45</td><td>135</td></tr><tr><td>50</td><td>150</td></tr><tr><td>55</td><td>165</td></tr><tr><td>60</td><td>180</td></tr><tr><td>65</td><td>195</td></tr><tr><td>70</td><td>210</td></tr><tr><td>75</td><td>225</td></tr><tr><td>80</td><td>240</td></tr><tr><td>85</td><td>255</td></tr><tr><td>90</td><td>270</td></tr><tr><td>95</td><td>285</td></tr><tr><td>100</td><td>300</td></tr></tbody></table> As the reaction comes to completion, gas is released and increases with time. The line of best fit is drawn through the data points. 1. Read the data from the table into a graph. 2. Describe the relationship between the variables. 3. Check the result of the reaction from the content of 25 seconds. Short activities (★)	Time (s)	Volume (cm³)	0	0	5	15	10	30	15	45	20	60	25	75	30	90	35	105	40	120	45	135	50	150	55	165	60	180	65	195	70	210	75	225	80	240	85	255	90	270	95	285	100	300	Worksheet 1 Worksheet 2 Learner worksheet (★)
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Stage 2 ★★ Interpreting graphs Introduction In this lesson we will cover the skills will be needed to answer a graph question. Learning objectives 1. Interpret graphs to describe the relationship between variables. 2. Describe the trend on a graph of reaction progress. 3. Explain the trend on a graph of reaction progress. Teacher-led presentation (★★): a full lesson including learning objectives, learner-facing instructions and activities.	Explaining the trends – answer Graph A: The rate of reaction is at its fastest between 0 and approximately 10 seconds. After 10 seconds the reaction slows down as the concentration of calcium carbonate decreases. There are fewer successful collisions between particles. The reaction stops at 25 seconds. The line of best fit is the line of best fit. Graph B: The rate of reaction is at its fastest between 0 and approximately 10 seconds. After 10 seconds the reaction slows down as the concentration of calcium carbonate decreases. There are fewer successful collisions between particles. The reaction stops at 25 seconds. The line of best fit is the line of best fit. Short activities (★★): learner-facing activities, designed as lesson starters or quick activities to engage prior knowledge.	Worksheet 1 Worksheet 2 Learner worksheet (★★): activities for learners to independently practice their maths skills. Suitable as classroom activity following the teacher presentation or as a home-learning task.																																												



Key terms support

Key maths vocabulary for each skill area is defined in the key terms support: rsc.li/4wypuqq. You will find the key terms listed by topic area and an accessible glossary slide for each term.

Using the short activities

The aim of this resource is for learners to revisit and practise skills from the teacher-led presentation and to develop problem solving skills so they can apply these independently.

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.

As you move through the activities, there is a clear progression in skill development, as learners practise specific graph interpretation skills within a chemistry context.

Activities can be teacher-led, for learners requiring additional support or modelling, or can be set as independent work.

The presentation contains three short activities that are designed to last 5–15 minutes and to be used as:

- a starter activity to engage prior knowledge or to practise a skill
- an assessment tool, used at the beginning of a lesson or sequence of work
- as follow-up independent practice during lessons or plenary
- for retrieval practice.

Metacognition

The activities support learners to develop their metacognitive skills in three key areas.

- **Planning** – prompt learners to draw on their existing mathematical knowledge by asking themselves: 'Have I seen a similar question before? Have I come across this mathematical skill before? Have I learned a different method for solving a similar problem?'
- **Monitoring** – prompt learners to ask themselves: 'How confident am I feeling with these mathematical skills? Which questions am I finding difficult? Which type of questions do I feel I have mastered?'
- **Evaluation** – prompt learners to ask themselves: 'What have I learned about myself when doing these questions? Which of the mathematical skills did I use to answer these questions?'



Slide notes

Slide 1: Title slide

Slide 2: Introduction

Introduce the learning objectives for interpreting graphs and discuss where learners might have engaged with this topic in maths.

Slide 3: Describing the overall trend

No notes.

Slide 4: Describing the overall trend (answers)

No notes.

Slide 5: Describing a graph

No notes.

Slide 6: Describing a graph (answers)

No notes.

Slide 7: Explaining the trends

No notes.

Slide 8: Explaining the trends (answers)

No notes.