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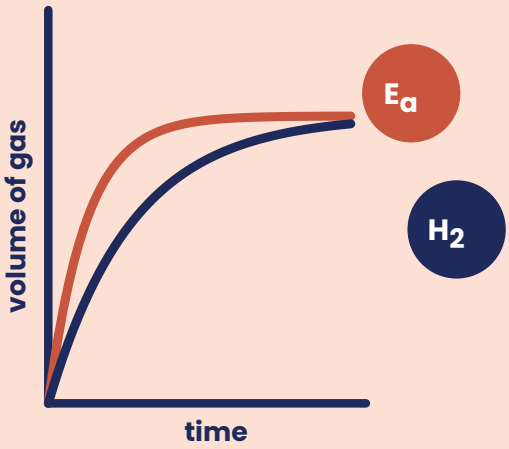
Year 10–11 • GCSE & IGCSE Chemistry

Rates of Reaction

Mark Scheme – Teacher Copy

Answers, marking points and guidance for the Rates of Reaction worksheet.



Collisions | Temperature | Concentration | Surface area | Catalysts | Equilibrium

KEY IDEAS IN THIS WORKSHEET

YEAR 10–11

Name: _____ Class: _____

Date set: _____ Date due: _____

What's inside

Section A	Collision theory	14 marks
Section B	Measuring rate	12 marks
Section C	Catalysts, energy and reversible reactions	13 marks

Marking notes

- (1) = one mark for each marking point.
- / separates alternative answers.
- Allow error carried forward in calculations.
- Accept any correct, clearly expressed alternative.

Total marks

39

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Rates of Reaction Worksheet – Mark Scheme

Total: 39 marks. (1) = one mark. Accept any scientifically correct alternative wording.

Section A – Collision theory

Q	Answer	Mark	Guidance
1(a)	collide; activation energy	2	1 mark each
1(b)	temperature	1	
1(c)	catalyst	1	
2	more particles in the same volume (1); so collisions are more frequent (1); so more successful collisions per second (1)	3	
3	powder has a larger surface area (1); so more particles are exposed to the acid (1); giving more frequent collisions (1)	3	
4	particles have more kinetic energy and move faster (1); so they collide more often (1); a greater proportion of collisions have energy equal to or greater than the activation energy (1); so more collisions are successful (1)	4	
	Section A total	**14**	

Section B – Measuring rate

Q	Answer	Mark	Guidance
5	measure the volume of gas with a gas syringe / upturned measuring cylinder (1); time how long it takes for a cross under the flask to disappear (1); measure the loss of mass on a balance (1)	3	1 mark each
6(a)	curve starting at the origin (1); steepest at the start, labelled as fastest (1); then levelling off (1)	3	
6(b)	reactant particles are used up (1); so the concentration falls and there are fewer collisions per second (1)	2	
6(c)	steeper at the start (1); same final volume, because the same mass of magnesium is used (1)	2	
6(d)	60 ÷ 40 (1); = 1.5 cm^3/s (1)	2	
	Section B total	**12**	

Section C – Catalysts, energy and reversible reactions

Q	Answer	Mark	Guidance
7	it provides an alternative reaction pathway (1); with a lower activation energy (1)	2	
8	any two: allows a lower temperature so reduces energy costs; more product made in less time; it is not used up / can be reused	2	
9	products drawn lower than reactants (1); catalysed curve has a lower peak (1); activation energy shown as an arrow from the reactants to the peak (1)	3	
10	equilibrium moves to the right / more ammonia is made (1); there are fewer gas molecules on the right (2 compared with 4) (1); so the system opposes the increase in pressure (1)	3	Higher tier / Extended
11	a lower temperature gives a higher yield (forward reaction is exothermic) but the rate is too slow (1); a higher temperature gives a faster rate but a lower yield (1); 450 °C is a compromise between yield and rate (1)	3	Higher tier / Extended
	Section C total	**13**	

Worksheet total: 39