

Topic 6: Kinetics (5 hours)

6.1 Rates of reaction

2 hours

	Assessment statement	Obj	Teacher's notes
6.1.1	Define the term <i>rate of reaction</i> .	1	
6.1.2	Describe suitable experimental procedures for measuring rates of reactions.	2	Aim 7: Data loggers can be used to collect data and produce graphs. TOK: The empirical nature of the topic should be emphasized. Experimental results can support the theory but cannot prove it.
6.1.3	Analyse data from rate experiments.	3	Students should be familiar with graphs of changes in concentration, volume and mass against time.

6.2 Collision theory

3 hours

	Assessment statement	Obj	Teacher's notes
6.2.1	Describe the kinetic theory in terms of the movement of particles whose average energy is proportional to temperature in kelvins.	2	
6.2.2	Define the term <i>activation energy</i> , E_a .	1	
6.2.3	Describe the collision theory.	2	Students should know that reaction rate depends on: <ul style="list-style-type: none">• collision frequency• number of particles with $E \geq E_a$• appropriate collision geometry or orientation.
6.2.4	Predict and explain, using the collision theory, the qualitative effects of particle size, temperature, concentration and pressure on the rate of a reaction.	3	Aim 7: Interactive simulations can be used to demonstrate this.
6.2.5	Sketch and explain qualitatively the Maxwell–Boltzmann energy distribution curve for a fixed amount of gas at different temperatures and its consequences for changes in reaction rate.	3	Students should be able to explain why the area under the curve is constant and does not change with temperature. Aim 7: Interactive simulations can be used to demonstrate this.

6.2.6	Describe the effect of a catalyst on a chemical reaction.	2	
6.2.7	Sketch and explain Maxwell–Boltzmann curves for reactions with and without catalysts.	3	