Topic 16: Kinetics (6 hours)

16.1 Rate expression

3 hours

	Assessment statement	Obj	Teacher's notes
16.1.1	Distinguish between the terms *rate constant*, *overall order of reaction* and *order of reaction* with respect to a particular reactant.	2	
16.1.2	Deduce the rate expression for a reaction from experimental data.	3	**Aim 7:** Virtual experiments can be used here.
16.1.3	Solve problems involving the rate expression.	3	
16.1.4	Sketch, identify and analyse graphical representations for zero-, first- and second-order reactions.	3	Students should be familiar with both concentration–time and rate–concentration graphs.

16.2 Reaction mechanism

1 hour

	Assessment statement	Obj	Teacher's notes
16.2.1	Explain that reactions can occur by more than one step and that the slowest step determines the rate of reaction (rate-determining step).	3	
16.2.2	Describe the relationship between reaction mechanism, order of reaction and rate-determining step.	2	Only examples with one- or two-step reactions where the mechanism is given will be assessed. **TOK:** Agreement between rate equation and a suggested mechanism only provides evidence to support a reaction mechanism. Disagreement disproves the mechanism.

16.3 Activation energy

2 hours

	Assessment statement	Obj	Teacher's notes
16.3.1	Describe qualitatively the relationship between the rate constant (k) and temperature (T).	2	
16.3.2	Determine activation energy (E_a) values from the Arrhenius equation	3	The Arrhenius equation and its logarithmic form are provided in the *Chemistry data*

	by a graphical method.		*booklet*. The use of simultaneous equations will not be assessed.