**Marks submitted to the IB by the school**

**Research design** 6/6  
*The research question is described clearly and specifically. The task is a considerable challenge: to obtain multiple values for activation energy. The background information provides a detailed and specific context. Variables are identified; explanations and values are given. The methodology is clear, concise and reproducible.*  
Overall best fit: **5−6 in all descriptors.**  
  
**Data analysis:** 6/6  
*The data is clearly presented, and the raw data is precise, with uncertainties and units given. The processed data (e.g. 1/T) is also clear. The significant figures in the processed data are appropriate, given that any rounding could introduce rounding error. The processing of the raw data to give the graphs and hence the activation energy values is appropriate and accurate. The calculations are clearly explained. Uncertainties are presented, explained, and processed to provide uncertainty bars on the graphs. Final values with uncertainties are given to an appropriate number of significant figures.*  
Overall best fit: **5−6 in all descriptors.**

**Conclusion:** 5/6  
*The conclusion is clearly described and justified with an appropriate comparison to bond strength (accepted scientific context). The conclusion is fully consistent with the analysis presented and follows the interpretation of processed data, including uncertainties. However, there could be more justification through the discussion of the impact of SN1 and SN2 substitution.*  
Overall best fit: **5−6 in all descriptors.**

**Evaluation:** 6/6  
*Specific methodological weaknesses and limitations are identified and explained. The relative impact of the limitations is commented upon. Realistic improvements to the investigation are explained.*  
Overall best fit: **5−6 in all descriptors.**

**Total mark submitted by school:  23/24**

**Mark awarded by the IB after external moderation and scaled to a maximum mark of 20.**

**17.5/**20

*The moderator felt that the evaluation criterion only achieved 4 marks (rather than the 6 awarded by the school). They felt that many of the weaknesses (endpoint determination, lack of repeats) were generic, rather than specific to the methodology. And that there could have been more explanation. This gave an overall mark of 21/24, which scaled to 17.5/20.*