Learner Activity 3

The Arrhenius equation

#### Part of the ‘Rates of reaction and the Arrhenius equation’ Topic Exploration Pack

1. State the Arrhenius Equation, and state the names and units of each variable/constant in the equation.

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1. The Arrhenius equation can also be written in the linear form:



This form is useful as it has the same structure as the formula for a straight line.



State which parts of the first equation equate to which parts of the second equation:

|  |  |
| --- | --- |
| *y =* |  |
|  |  |
| *m =* |  |
|  |  |
| *x =* |  |
|  |  |
| *c =* |  |
|  |  |

1. Determine the activation energy, in kJ mol–1, and the value of *A*, given the following data:

| ***T* / °C** | ***k* / mol** −**1 dm3 s** −**1** |  |  |  |
| --- | --- | --- | --- | --- |
| 5 | 0.326 |  |  |  |
| 15 | 0.543 |  |  |  |
| 25 | 1.06 |  |  |  |
| 35 | 1.64 |  |  |  |
| 45 | 2.09 |  |  |  |

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1. Determine the activation energy, in kJ mol-1, and the value of *A*, given the following data:

| ***T* / °C** | ***k* / mol** −**1 dm3 s** −**1** |  |  |  |
| --- | --- | --- | --- | --- |
| 50 | 3.35 × 10–4 |  |  |  |
| 78 | 1.66 × 10–3 |  |  |  |
| 111 | 4.08 × 10–2 |  |  |  |
| 203 | 8.19 × 10–1 |  |  |  |
| 298 | 7.39 |  |  |  |

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