Teaching rates of reaction post-16: next steps

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rsc.li/3jV0WVq

These steps follow those from the graphical representations in the Teacher checklist, which accompanied the first Teaching rates of reaction post-16 article (rsc.li/3yLp1nU).

Introducing the rate equation

Students should be familiar with transforming a relationship that shows a proportional relationship into an equation by including a constant of proportionality.

Rate $\boldsymbol{\propto [x]^n}$ **becomes** ***Rate*** $\boldsymbol{= k[x]^n}$

Where *k* is the rate constant. This is only a constant when the temperature remains the same or when a catalyst doesn't affect the rate.

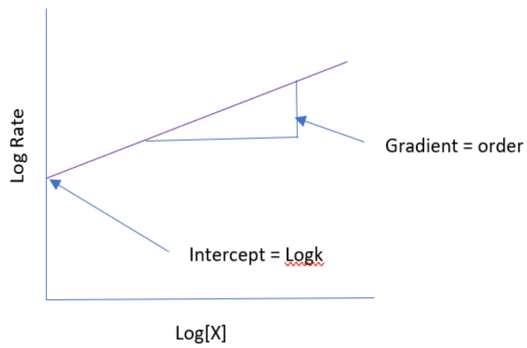
Calculating the rate constant

Now take Log_{10}

Log rate = logk + nlog[x]

This equation form can be compared to $y = mx + c$

Log rate	=	*logk*	+	*nlog[x]*
y	=	*c*	+	*mx*



So, plotting *log[x]* against *log rate* allows the gradient *n* (order) to be calculated. The intercept is *logk* which is important for calculating the *Ea*.

Calculating the activation energy (E_a)

Applying the Arrhenius equation

$k = Ae^{-Ea/RT}$

Take natural logarithms and plot *lnk* versus *1/T*