The Arrhenius equation is used to determine the activation energy ($E_a$) from experimental data

$$k = A e^{-\frac{E_a}{RT}}$$

- **Graphical Form**

$$\ln k = \ln A - \frac{E_a}{R} \left( \frac{1}{T} \right)$$

- **Two point form**

$$\ln \frac{k_2}{k_1} = -\frac{E_a}{R} \left( \frac{1}{T_2} - \frac{1}{T_1} \right)$$

**The Boltzmann Plot**

![Boltzmann Plot](image)

Example: A reaction triples its rate when the temperature increases from $25 \, ^\circ C$ to $37 \, ^\circ C$. What is the activation energy?

Example: A reaction has $E_a = 75 \, kJ/mol$. If $k = 1.50 \times 10^{-3}$ at $25 \, ^\circ C$, what is $k$ at $50 \, ^\circ C$?