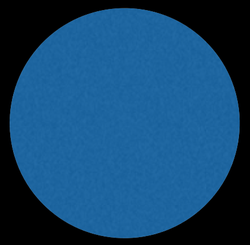
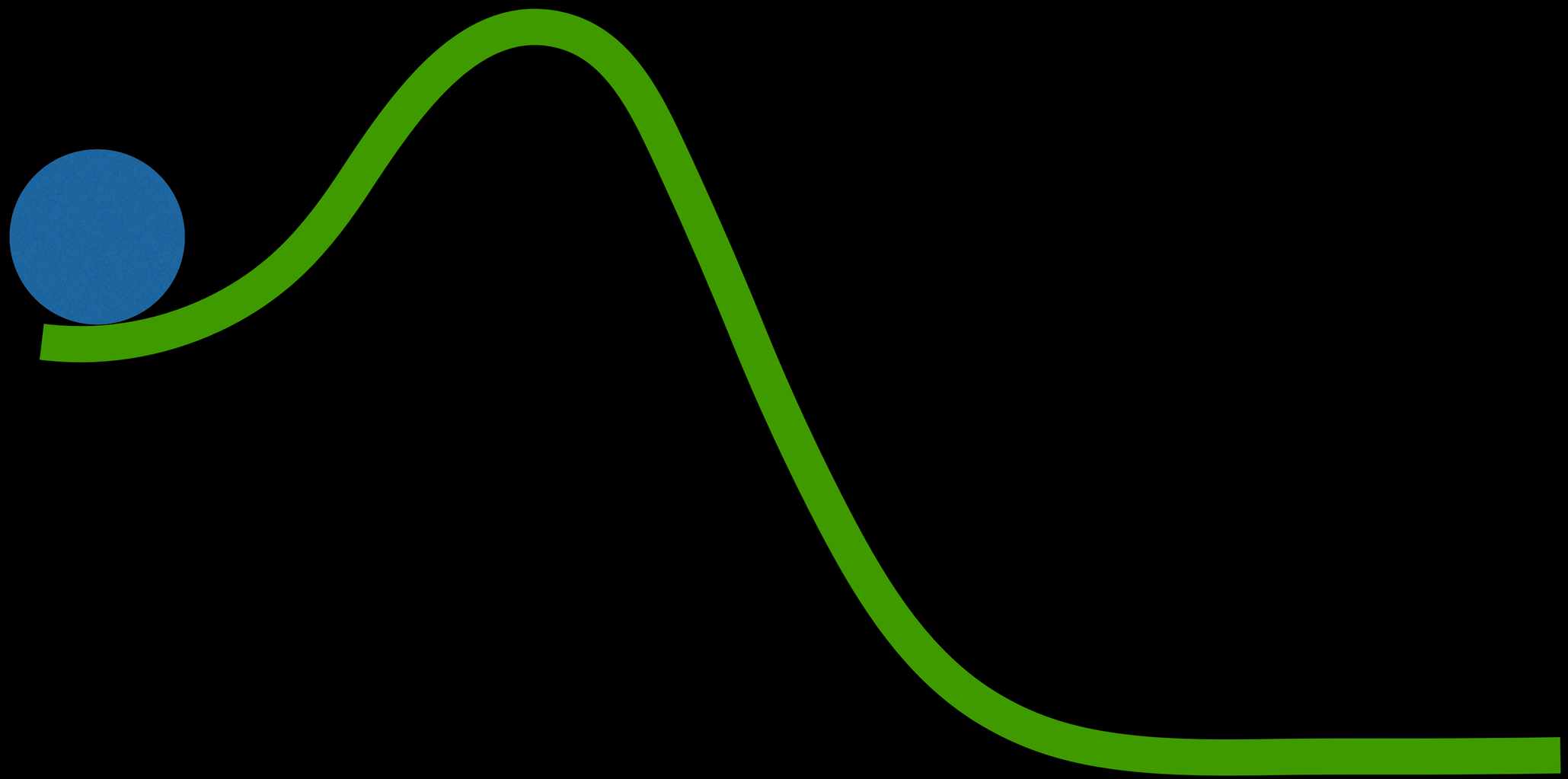
The Reaction Path



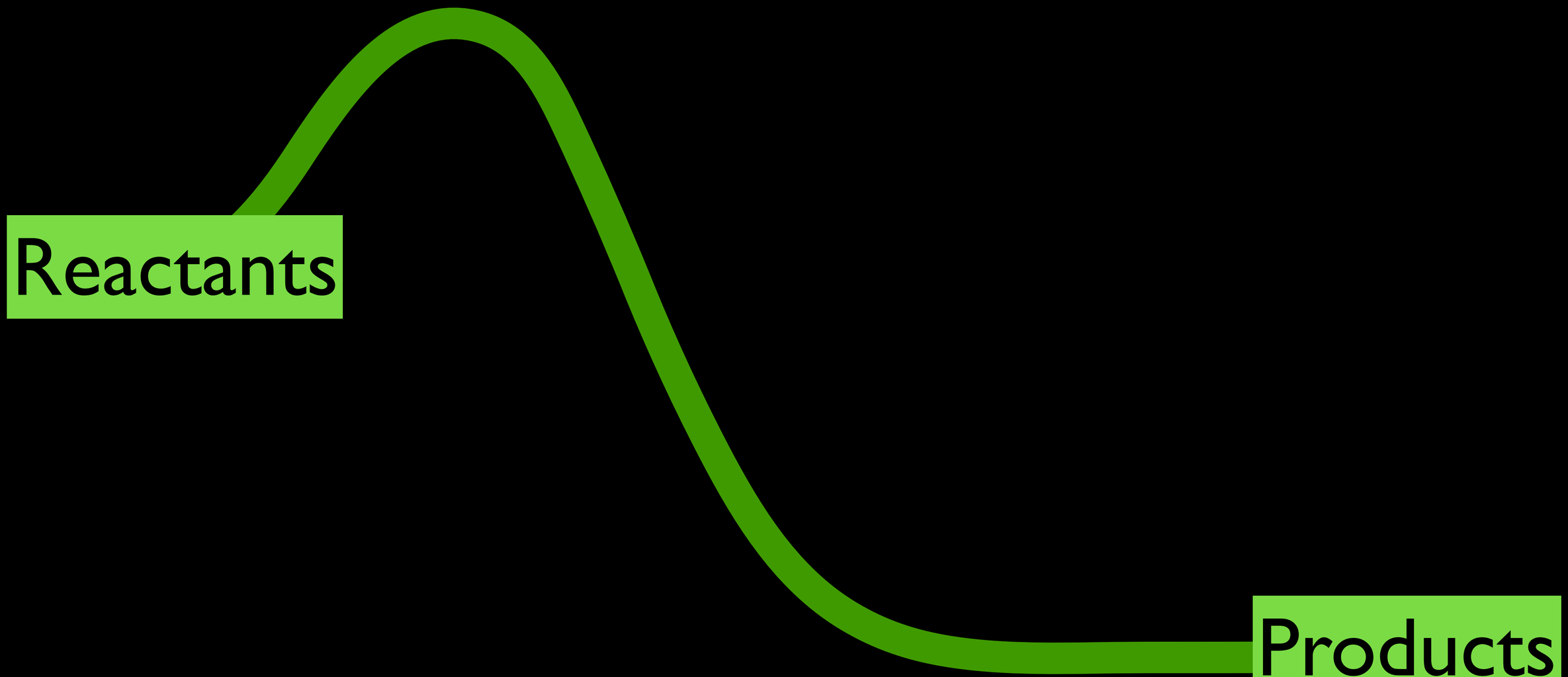
Chemistry Essentials - 040

The Reaction Path



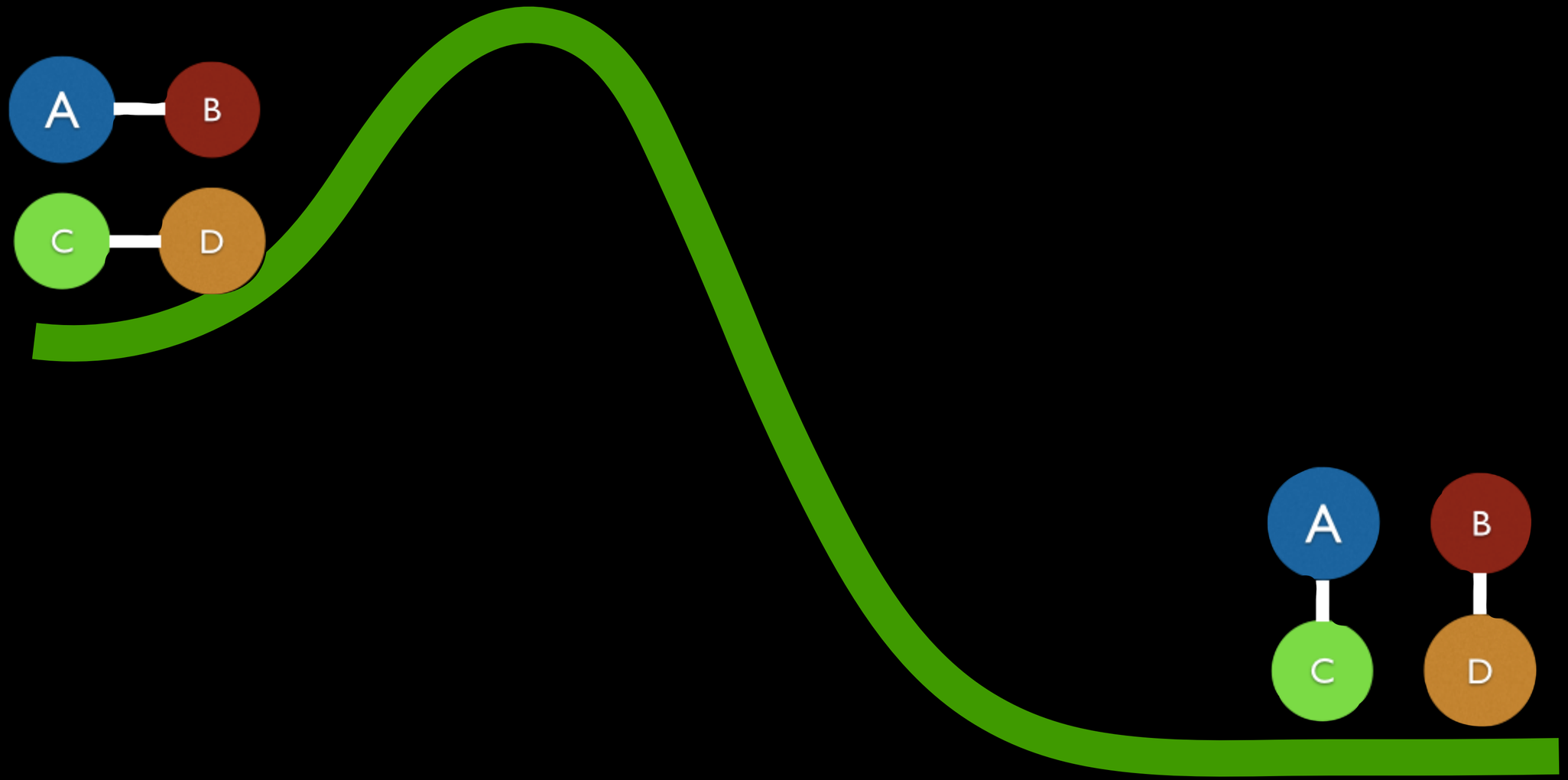
Chemistry Essentials - 040

The Reaction Path



Chemistry Essentials - 040

The Reaction Path



Chemistry Essentials - 040

Elementary Reaction

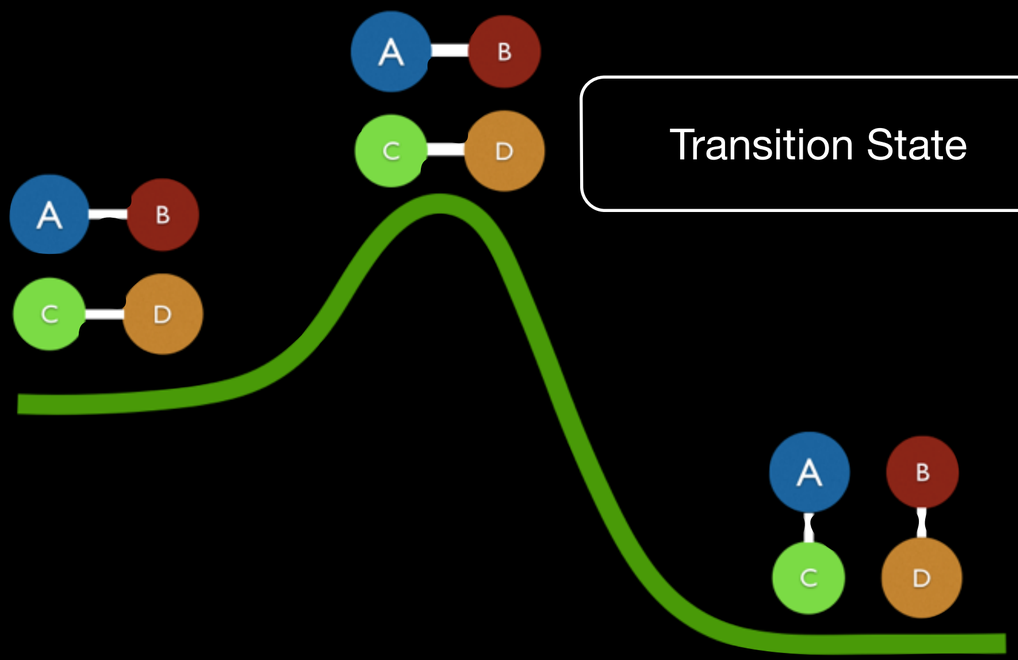
Arrhenius Equation

Breaking Bonds

Energy Profile

Temperature dependence

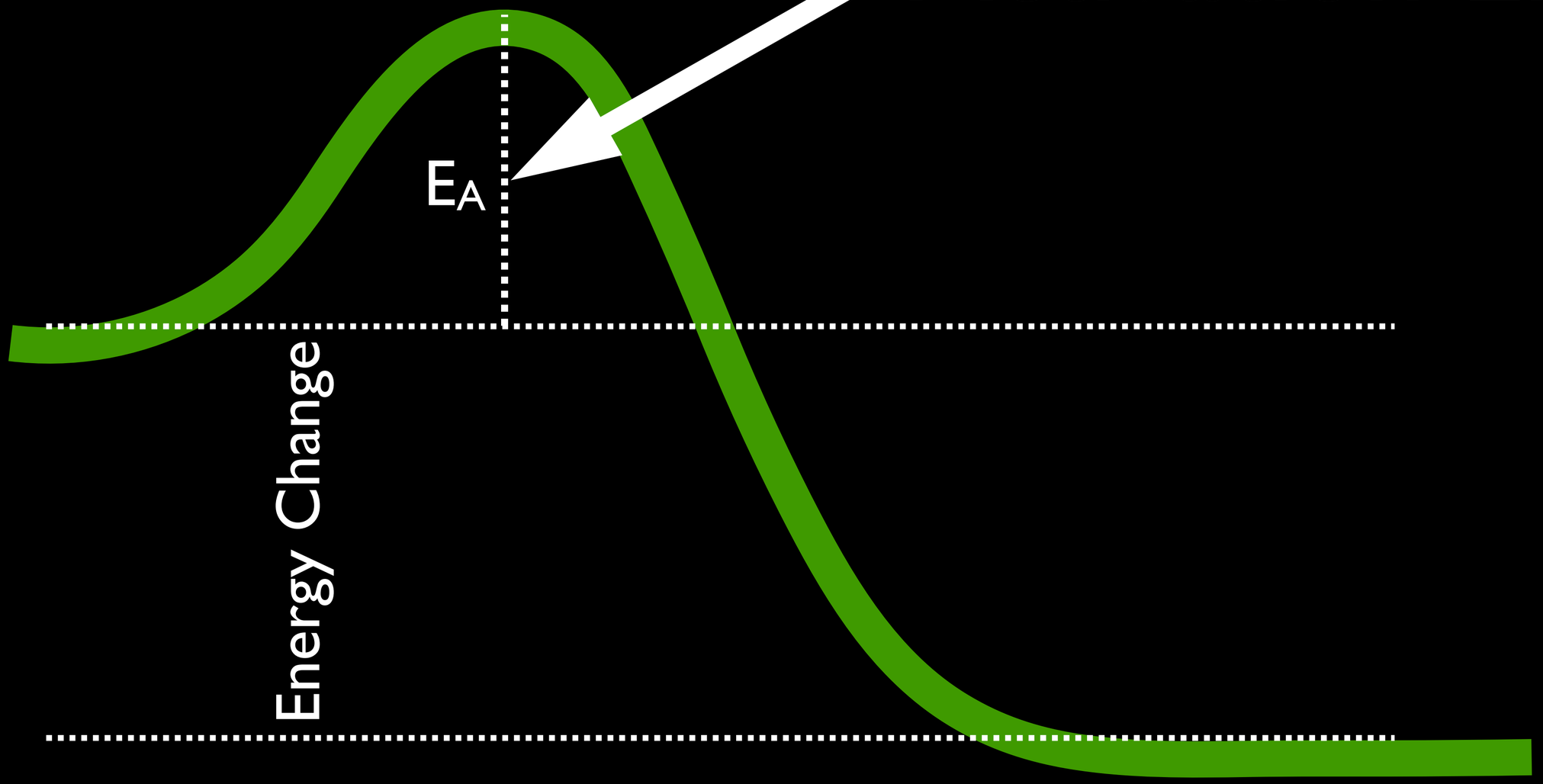
Forming New Bonds

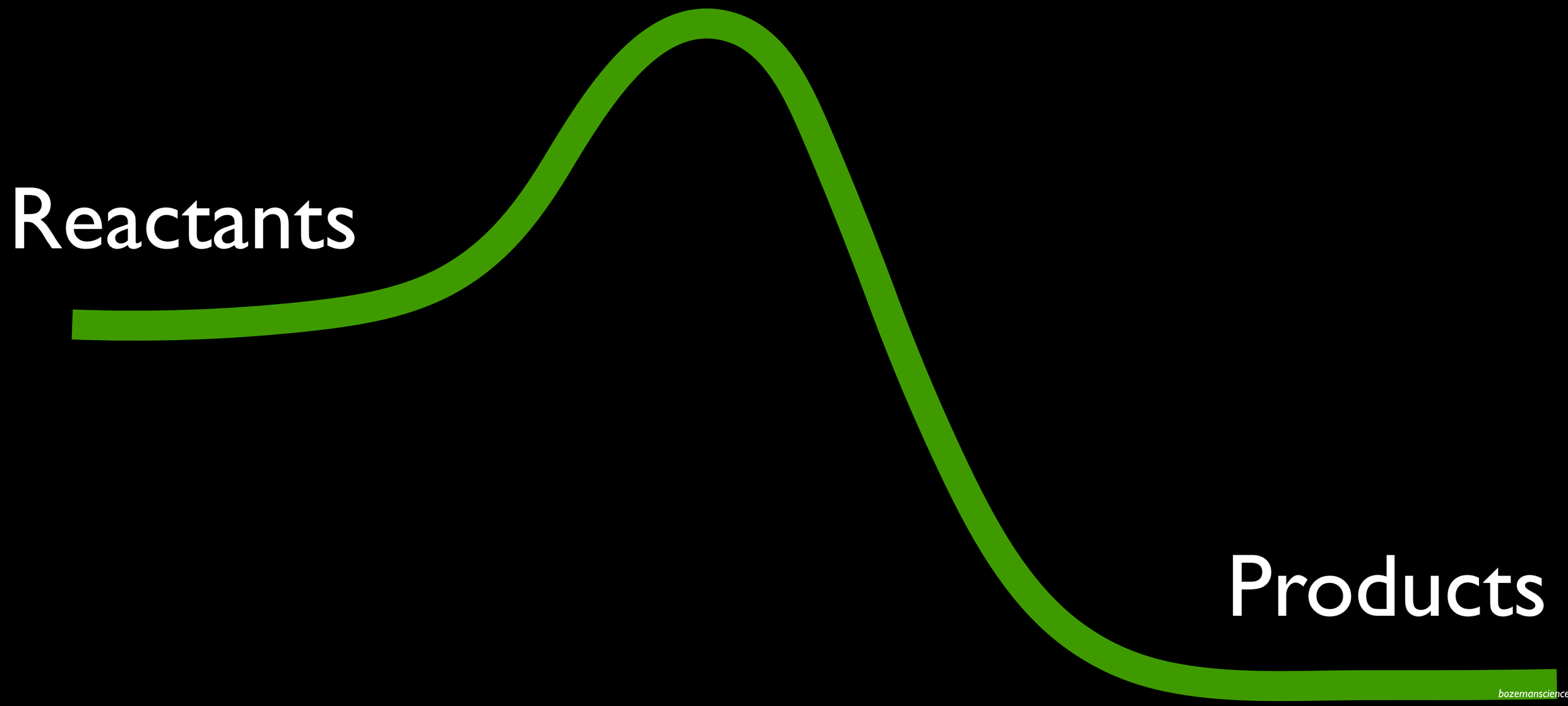


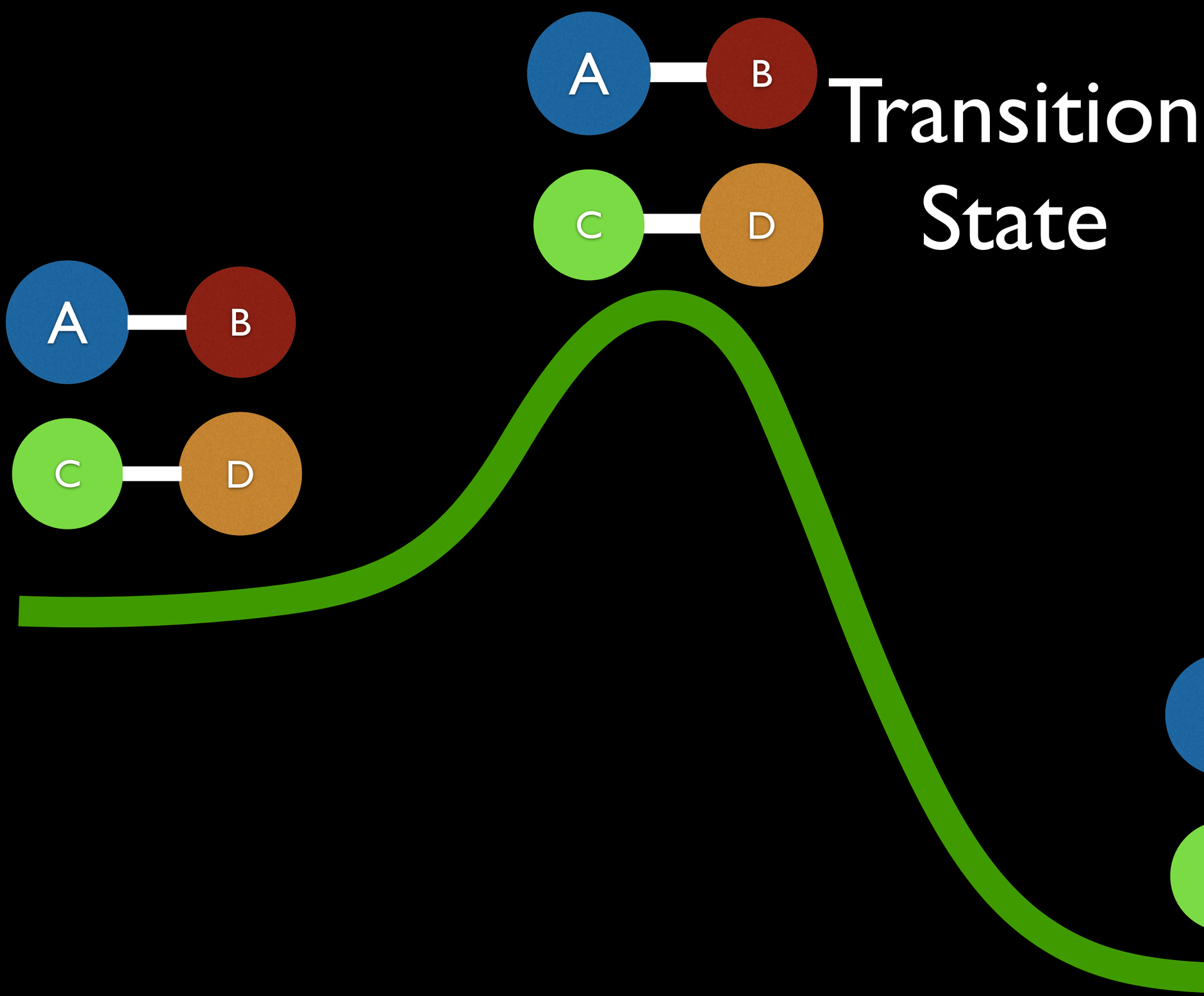
Transition State

Activation Energy

Activation Energy







Arrhenius

A ⟶ Products

Svante Arrhenius

$$\text{Rate} = k\,[A]^m$$

Temperature Dependent

Arrhenius Equation

Svante Arrhenius

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

Arrhenius Equation

Svante Arrhenius

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

- k: rate constant
- A: frequency factor
- Ea: activation energy
- R: gas constant
- T: temperature

Arrhenius Equation

Svante Arrhenius

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

rate constant

activation energy

temperature

Arrhenius Equation

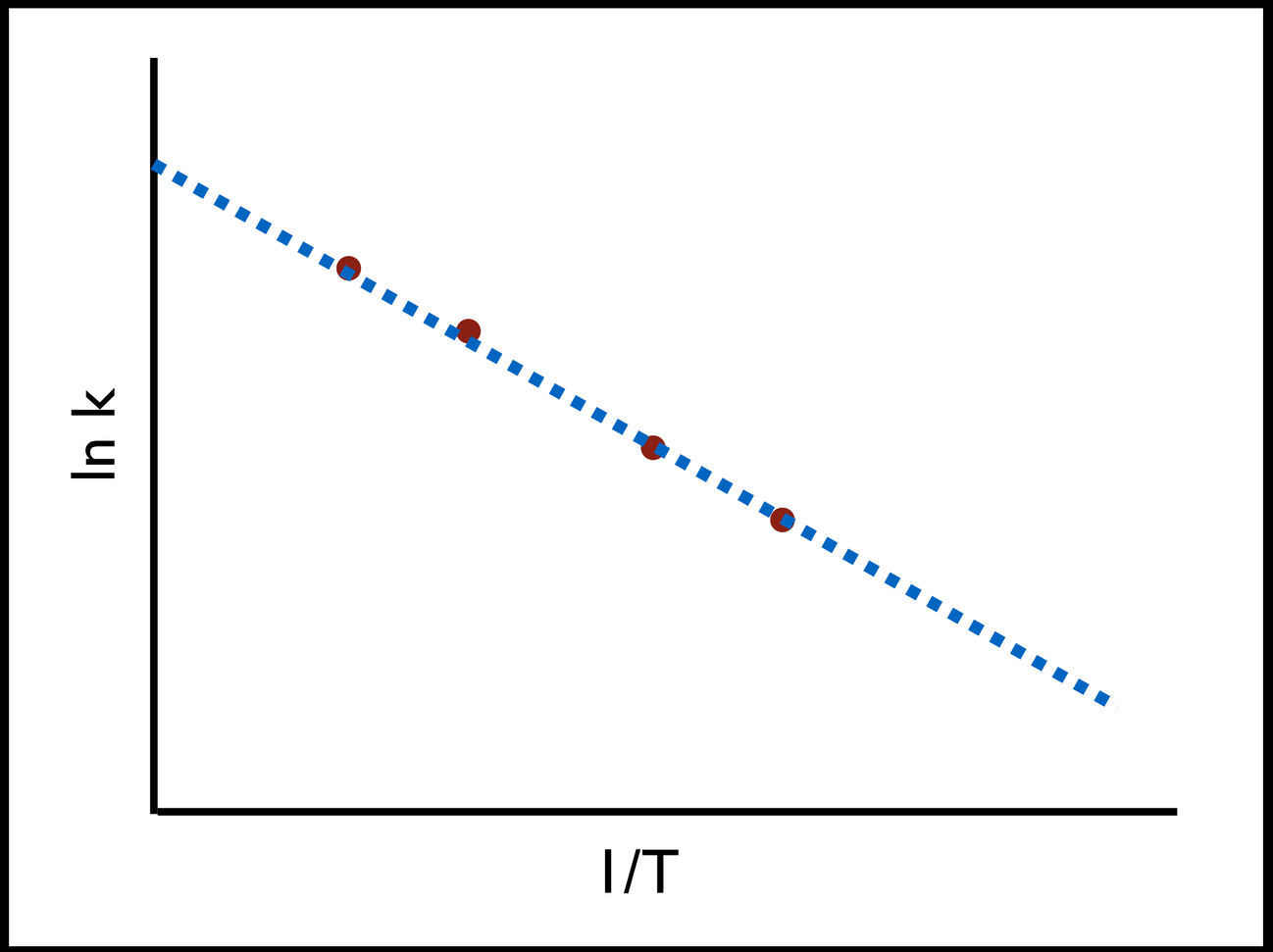
Svante Arrhenius

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

$$\ln k = -\frac{Ea}{RT} + \ln A$$

$$y = mx + b$$

$$\ln k = -\frac{Ea}{RT} + \ln A$$

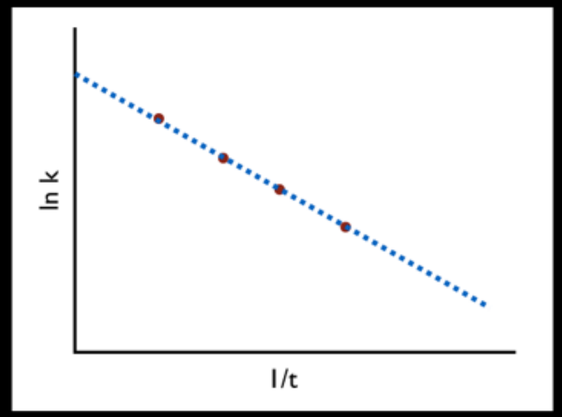


Temp (K)	k (s^{-1})
460	2.51×10^{-5}
482	5.51×10^{-5}
506	6.13×10^{-4}
519	3.19×10^{-3}

$$\text{slope} = -\frac{Ea}{R}$$

Did you learn?

$$\ln k = -\frac{Ea}{RT} + \ln A$$



$$\text{slope} = -\frac{Ea}{R}$$

To explain the difference between successful and unsuccessful reactions in terms of energy and orientation.

Acknowledgements

"File:Arrhenius2.jpg," October 26, 2013. *http://en.wikipedia.org/wiki/File:Arrhenius2.jpg*.

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