

# Introduction for Module 3 – Reactions and Catalysis

Textbook: [Open Stax Chemistry 2e](#)

Suggested Reading: Chapter 12.5-12.7

Learning Objectives:

- Define the concepts of activation energy and transition state
- Use the Arrhenius equation in calculations relating rate constants to temperature
- Explain the function of a catalyst in terms of reaction mechanisms and potential energy diagrams
- Derive the rate law consistent with a given reaction mechanism

Captions and Attributions:

- 1) This graph shows a chemical reaction with species A and B becoming C and D, highlighting the energy to initiate the reaction as activation energy, and enthalpy change. [Figure 12.4 Extent of Reaction](#) by [OpenStax](#) is licensed under [CC BY 4.0](#).
- 2) Catalyzing a reaction breaks up its activation energy barrier. The reaction will be limited by the highest point on this new reaction coordinate, which is lower than the uncatalyzed reaction. [Figure 12.19 Reaction coordinate for an endothermic process](#) by [OpenStax](#) is licensed under [CC BY 4.0](#).
- 3) Higher temperature refers to higher average kinetic energy, meaning the distribution of molecular motion will shift to the right and more molecules will have the energy required to proceed forward in a chemical reaction. [Figure 12.15 Molecular energy distributions](#) by [OpenStax](#) is licensed under [CC BY 4.0](#).
- 4) A reaction coordinate shows the progression of a reaction on the x-axis and the energy of the chemical species on the y-axis. [Chapter 12 Question 79 Figure a](#) by [OpenStax](#) is Licensed under [CC BY 4.0](#).
- 5) A reaction coordinate shows the progression of a reaction on the x-axis and the energy of the chemical species on the y-axis. [Chapter 12 Question 80 Figure a](#) by [OpenStax](#) is Licensed under [CC BY 4.0](#).



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