



Progress
starts
with **you.**

75
YEARS



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SYDNEY

Interested in environmental sustainability?

Chemical and Chemical Product Engineers work in areas related to:

- Water treatment and air quality management
- Clean energy technologies (batteries, solar energy, fuel cells and nuclear power)
- 'Green' materials development, like sustainable products for buildings or packaged goods

Technology and innovation in these areas work toward environmental sustainability and all involve the use of catalysts!



So, what do I need to study...

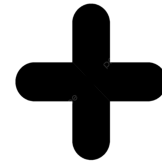
... to be part of the solution for the future?



Undergraduate Programs

**BE Honours in
Chemical
Engineering**

**BE Honours in
Chemical Product
Engineering**



Combined degrees (computer, science, arts, commerce, ...)
Opportunity to develop skills matching your unique interest and passion

- Professionally accredited by industry associations
- Including 60 days industrial training for opportunity for real on-the-job experience

IChemE ADVANCING
CHEMICAL
ENGINEERING
WORLDWIDE



Degree Structure

1st Year

- **Introductory units**
- **Core courses**
- **Could be flexible!**

Maths
Physics
Engineering Chemistry
Intro to engineering design
Computing for engineers

2nd Year

- **Introduction to your specialisation**
- **Specialisation core courses**

Material and energy systems
Fluid mechanics
Heat and mass transfer
Chemical reaction engineering
Chem. Eng. Lab

3rd Year onwards

- **Further your knowledge in your specialisation**
- **Electives and Research Projects**

Process modelling
Process plant design
Process plant equipment
Process control
Process design project

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Elective courses

Advanced reaction engineering
Advanced polymers
Advanced transport phenomena
Advanced food processing

Data-driven decision making in chemical engineering
Pharmaceutical design and engineering
Hydrogen systems and economics
Energy storage
Membrane processes in water and air treatment

Collaboration and Innovation in Business
Grand Challenges for Engineering
Sustainable Energy
Entrepreneurial Engineering

Minors:

- Nuclear Engineering
- Humanitarian Engineering



Careers



Energy



Water



Health



Environment



Materials



Equipment

Jobs + Industries

- Process/Design/Production Engineer
- Operations Manager
- Pharmaceutical
- Polymer and Nanomaterial
- Building and Construction
- Food Science and Manufacturing
- Mining and Gas
- Development Chemist
- Research Scientist
- Petrochemical
- Metallurgist
- Engineering Consultant

Visit our new Degree Finder pages



Scan to find out more about our Chemical Engineering degree!



Scan to find out more about our Chemical Product Engineering degree!

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Still curious?

 1300 UNI NSW (1300 864 679)

 unsw.edu.au/ask

 unsw.edu.au/study

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 @unsw





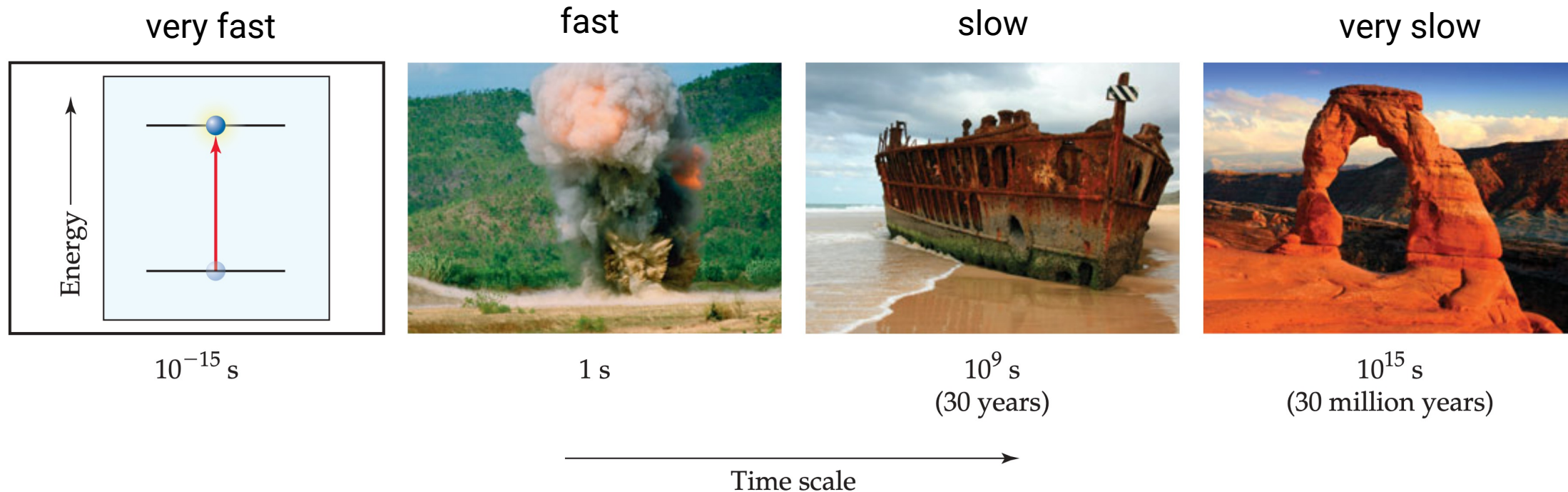
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What affects the rate of a chemical reaction?



What does the 'rate' of a chemical reaction refer to?

It is the speed at which a chemical reaction occurs.

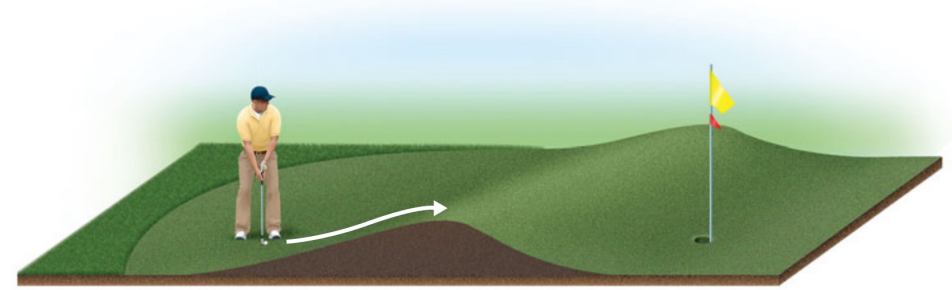
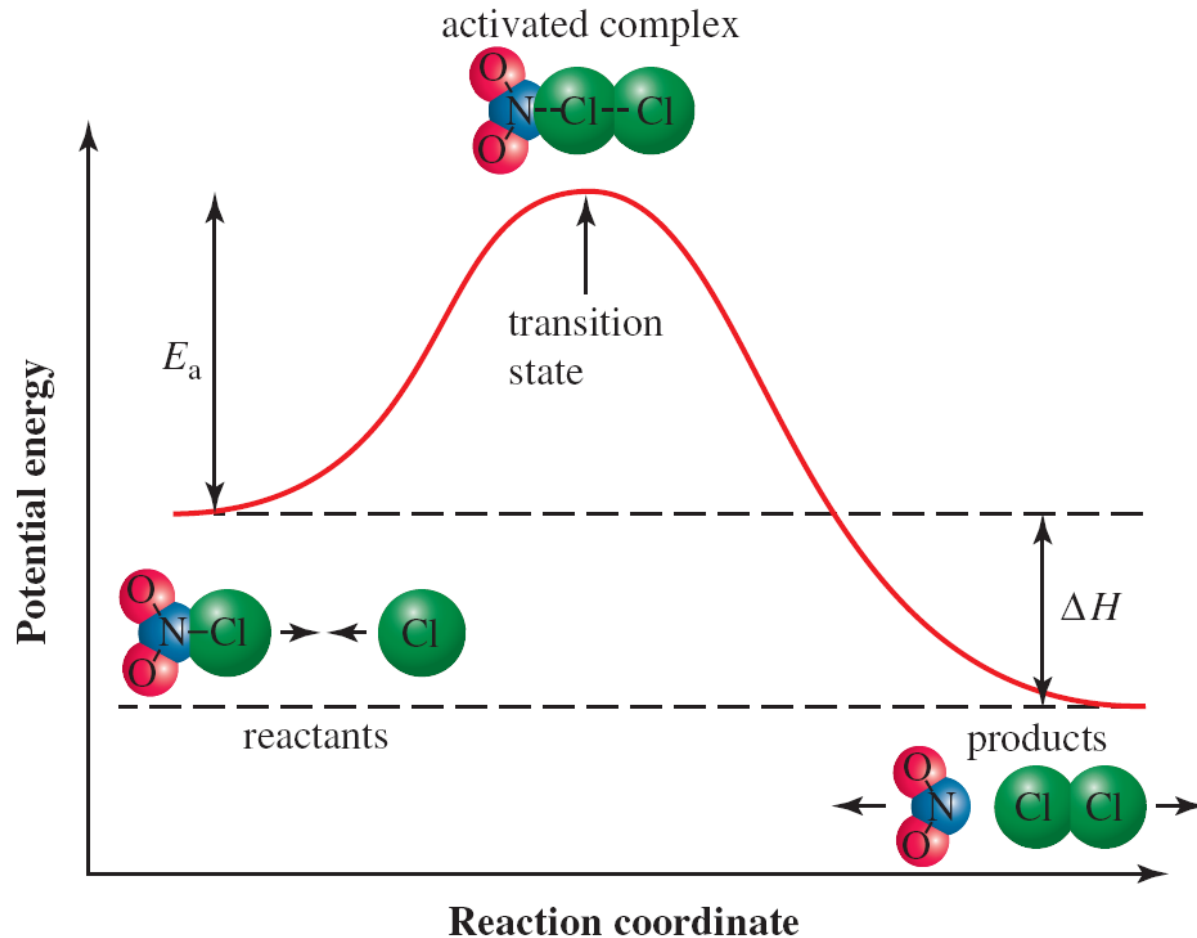


How does a chemical reaction occur?

However...

Not every collision leads to a chemical reaction!

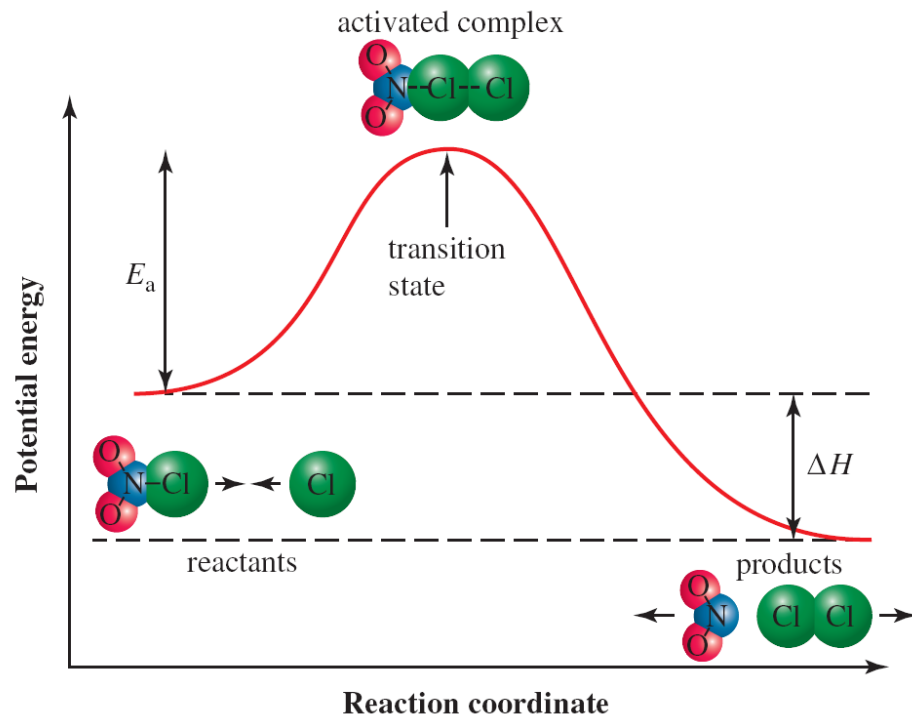
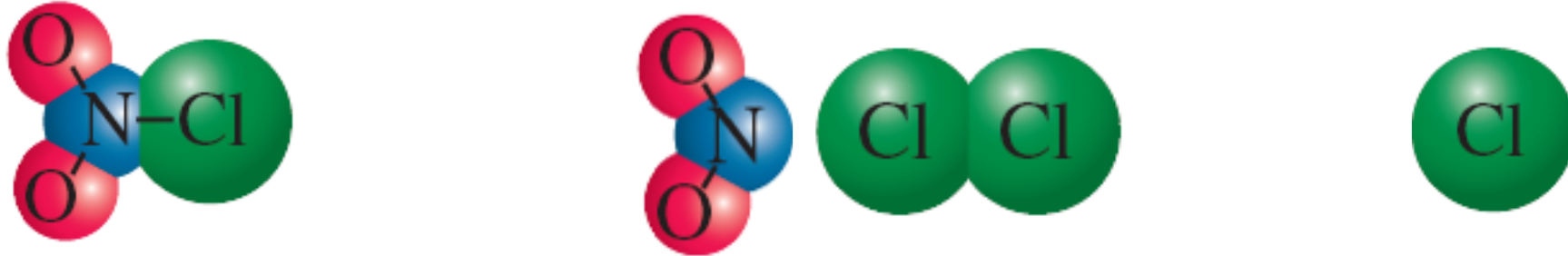
What does an Energy Profile Diagram tell us?



When two molecules collide, they must collide with sufficient energy to overcome the energetic barrier to the reaction.

This barrier is called the **activation energy (E_a)**

Activation Energy



If the reactants do collide with sufficient energy, a reaction will occur

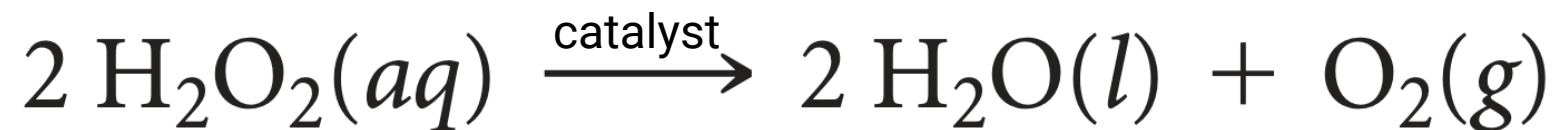
What are the factors that affect the rate of a reaction?

Variables that affect the number of successful collisions that occur every second include:

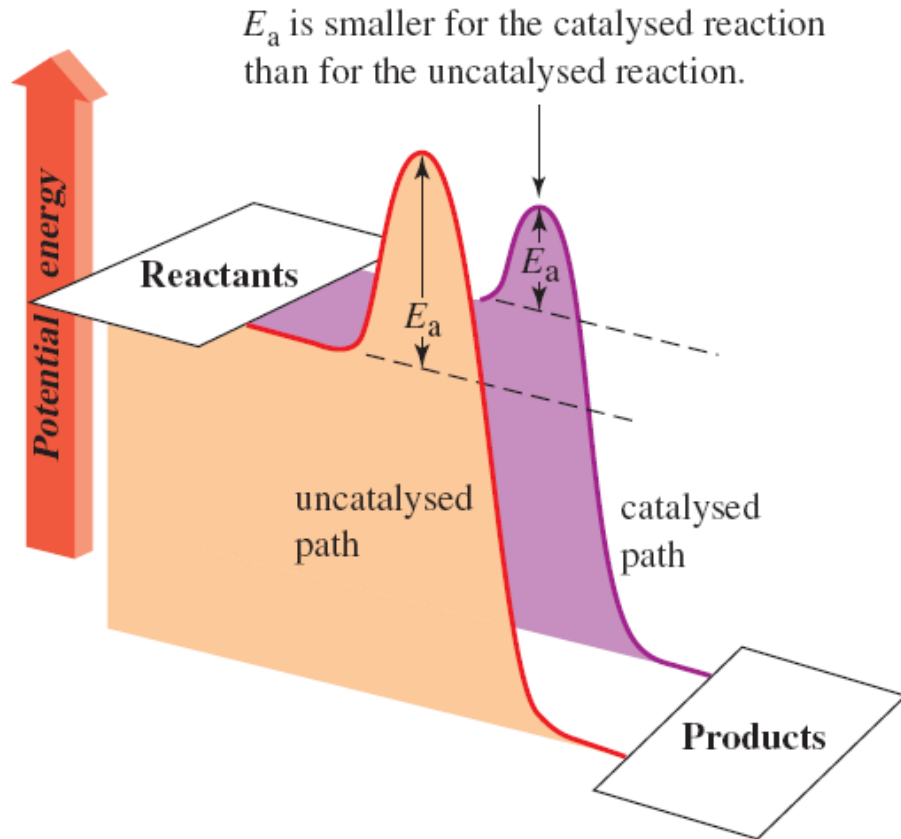
- Temperature
- Particle size of solids
- Concentration (or pressure for a gas)
- **The presence of a catalyst**

What is a catalyst?

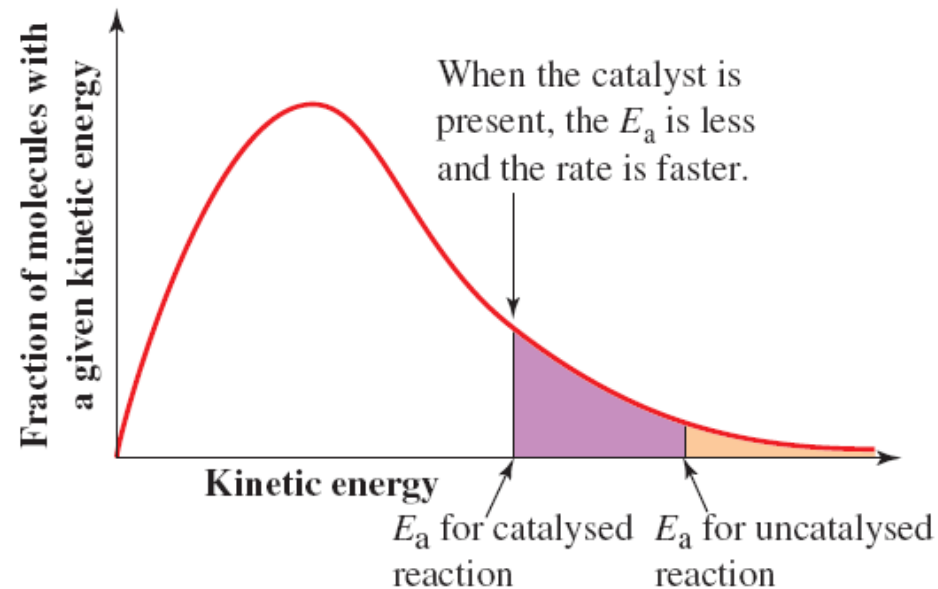
A **catalyst** is a substance that changes the speed of a chemical reaction *without under-going a permanent chemical change itself*.



What difference does a catalyst make to the rate of a reaction?

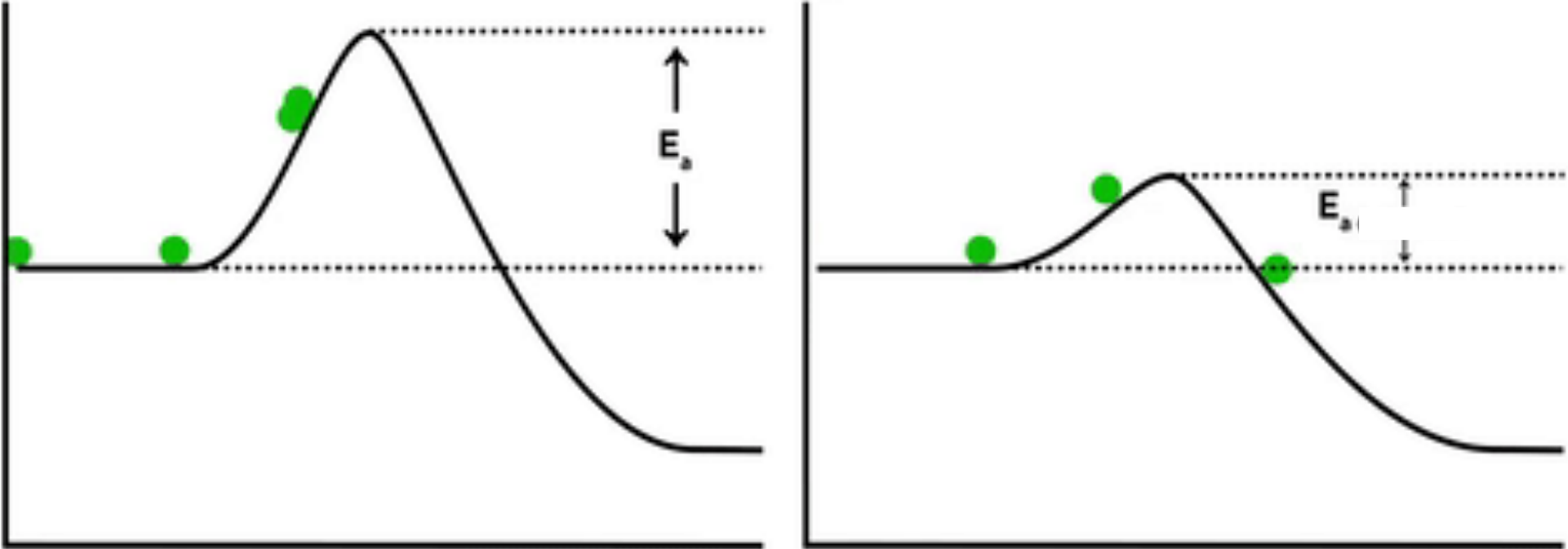


When a catalyst is present, E_a is smaller. Therefore, a bigger fraction of molecules have enough energy to overcome the E_a and so the reaction rate is faster.



The activation energy (E_a) of a reaction is lowered when using a catalyst

“Compare the pair”



Timeline

