

Kinetics 15.3

Factors Affecting Reaction Rates
Activation Energy, E_a

Factors Affecting Reaction Rate

- 1) Rate of collisions between reactants
- 2) Percentage of collisions with an orientation that could produce a reaction
- 3) Percentage of collisions possessing sufficient energy (the activation energy) to produce a reaction

Collision Rate

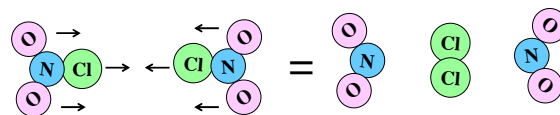
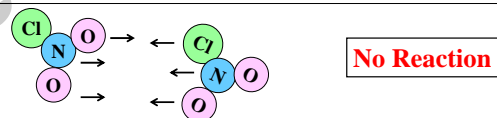
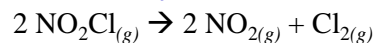
Collision Rates Increase...

- As the concentration of reactants increases.
- As temperature increases.

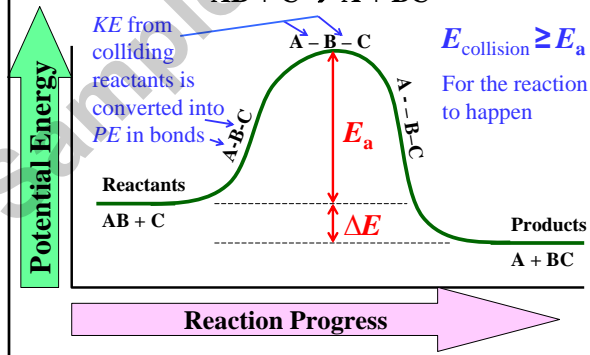
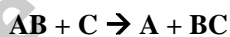
Not every collision triggers a chemical reaction!

Collision Orientation

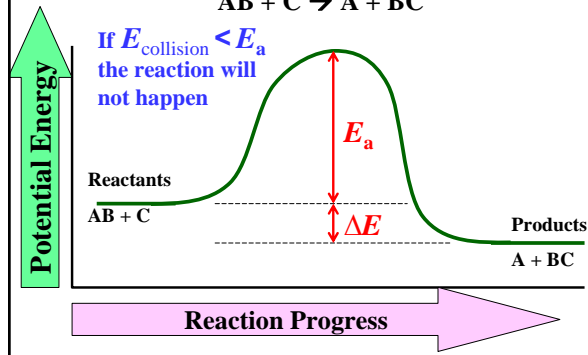
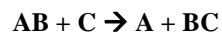
Molecules must collide with an orientation that can yield a reaction.

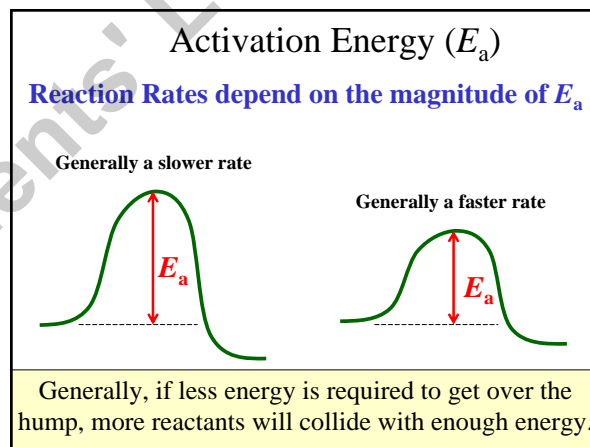
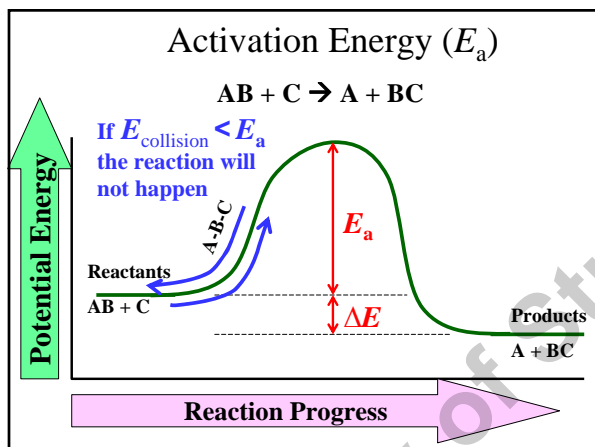
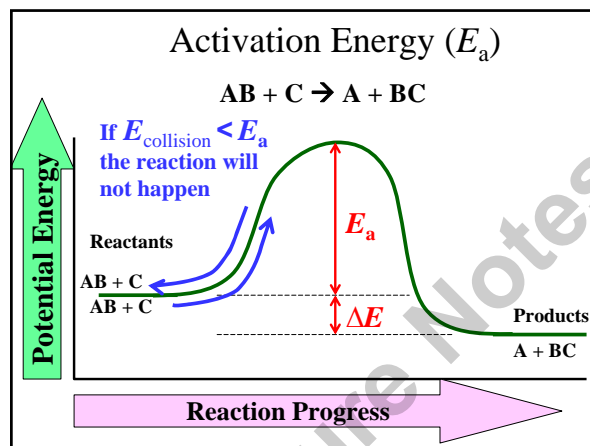
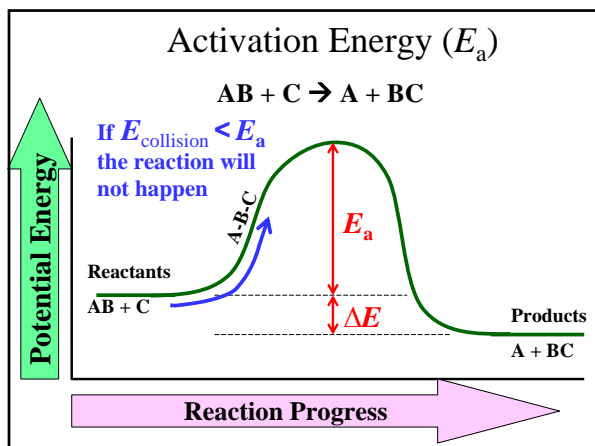


Activation Energy (E_a)



Activation Energy (E_a)





In Summary

All 3 of the following conditions must be met in order for a reaction to occur.

- 1) There must be a collision.
- 2) The collision must occur with an orientation that could yield a reaction.
- 3) $E_{\text{collision}} \geq E_a$

