# Collision-Reaction Theory

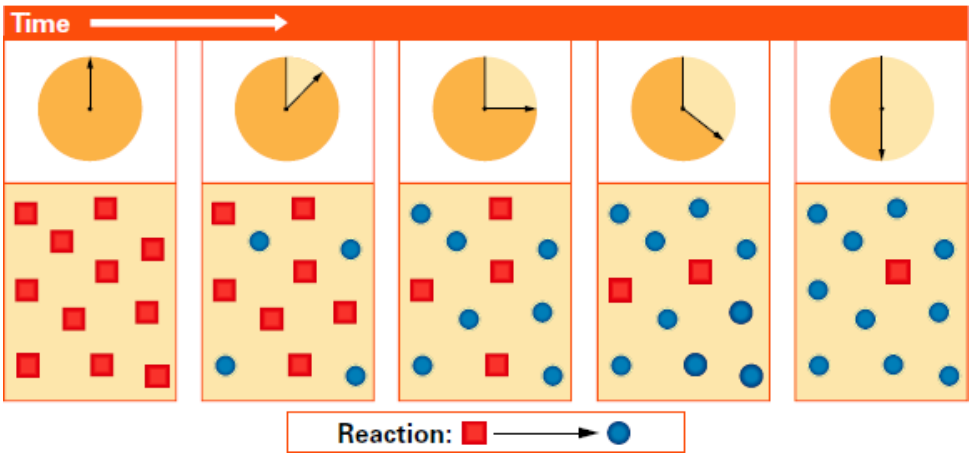
Main principles of the **collision-reaction theory**:
1. all chemical reactions involve collisions between atoms, ions or molecules
2. a certain amount of kinetic energy is required for a reaction to occur
3. a certain orientation of particles is required

# Chemical Equilibrium

# Rate of Reaction

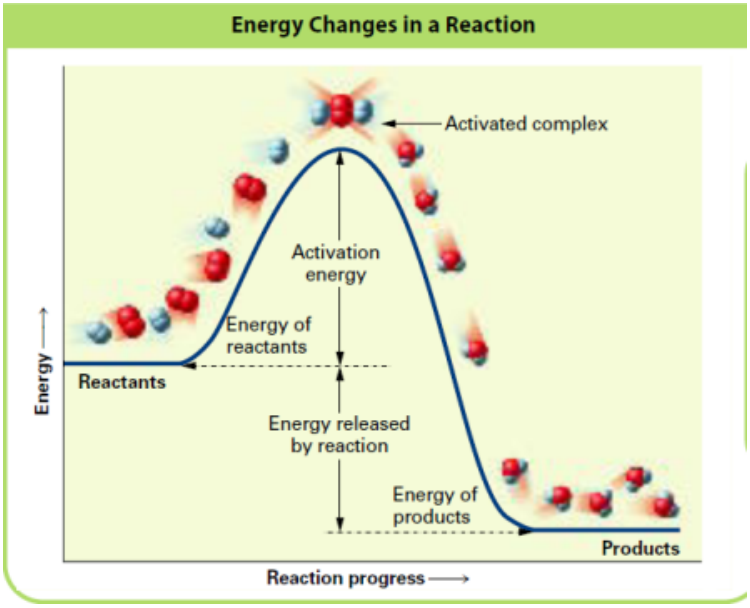
## Reaction Rate

Amount of reactant changing per unit time



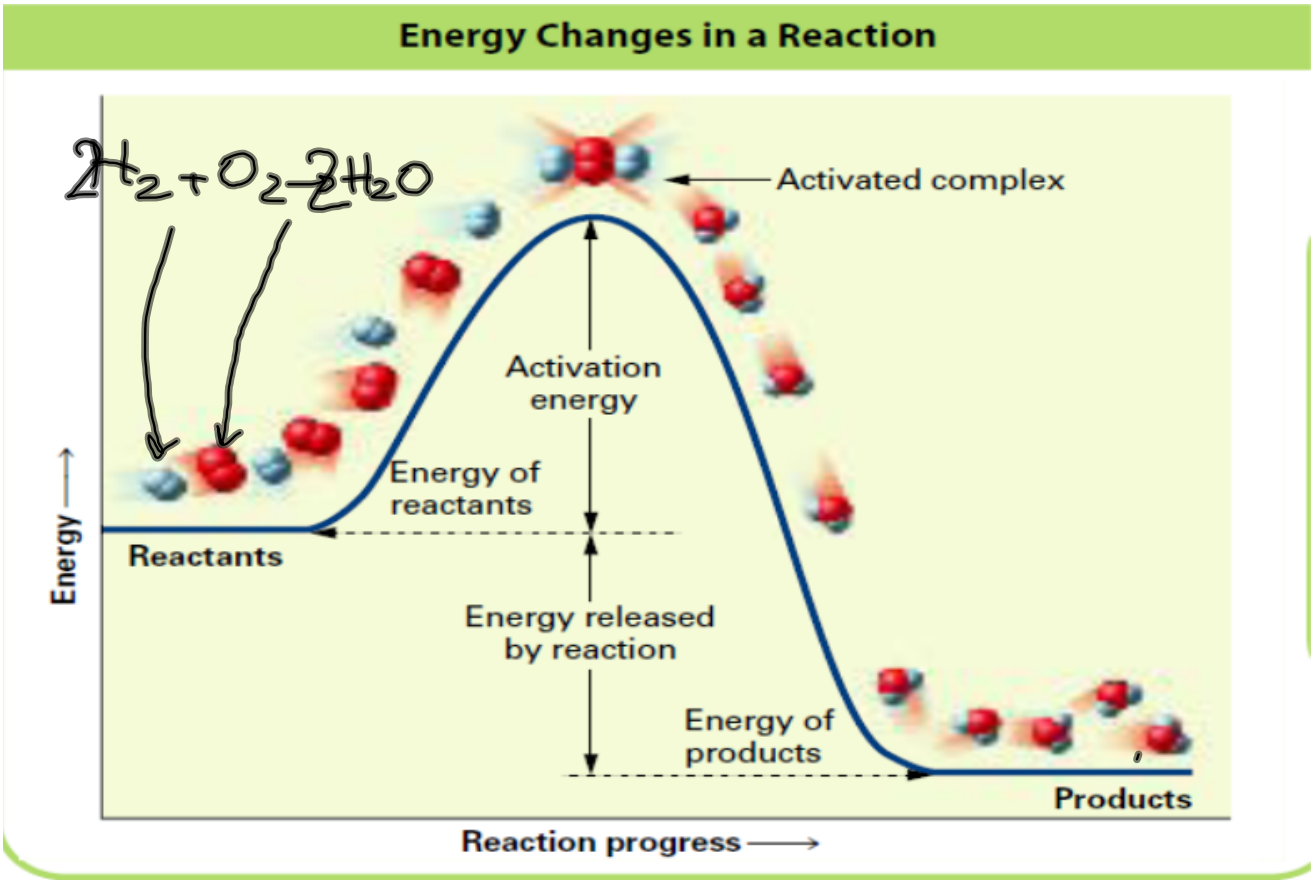

## Activation Energy

Minimum amount of energy that colliding particles must have in order to react




## Activated Complex (Transition State)

Unstable arrangement of atoms that forms at the peak of the activation-energy barrier




http://www.youtube.com/watch?v=VbIaK6PLrRM

http://www.youtube.com/watch?v=rl50M-wNVcs

# Factors Affecting Reaction Rates

**Temperature**
Raising the temperature speeds up the rate of reaction
- More collisions, and more particles with enough kinetic energy to overcome activation energy barrier

Ex. burning of charcoal

**Concentration**
Increased concentration increases rate of reaction
- More particles, more collisions, higher rate of reaction

Ex. glowing splint in pure oxygen

**Particle Size**
Larger the particle, slower the rate of reaction
- Larger particle, less surface area, less reactant available for collision

Ex. Burning log in a fire

**Catalyst**
Lowers the activation energy for a reaction, increasing rate of reaction
- Not consumed in chemical reaction

Ex. Enzymes in digestive tract

**Inhibitor** - substance that interferes with the action of a catalyst, often by reacting with the catalyst

# Homework

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