Culver City H.S. • Chemistry Honors

Name KEY

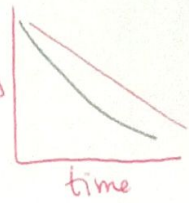
Period _____ Date _____

# 17 · Reaction Rates

## 17.1 NOTES – A MODEL

**Expressing Reaction Rates** $A + B \rightarrow C + D$

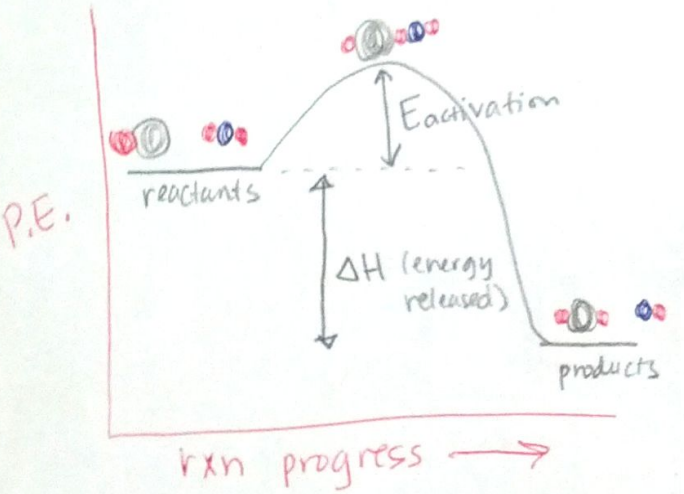
Average rate = $\frac{\Delta \text{quantity}}{\Delta \text{time}} = \frac{[A] \text{ at time } t_2 - [A] \text{ at time } t_1}{t_2 - t_1} = \frac{\Delta [A]}{\Delta t}$

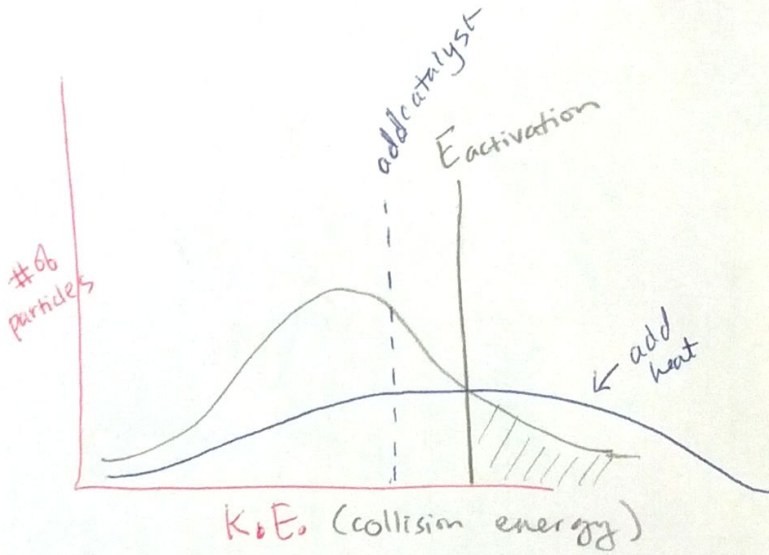



**Collision Theory** ④ rates are determined by expt.

| In order for a reaction to take place … | In order to speed up a reaction … | |
|---|---|---|
| 1) reacting substances must collide | 1) Increase the initial concentrations | 2) Increase surface area. |
| 2) reacting substances must collide with the correct orientation. | 3) Heat it up in order to provide more energy | |
| 3) reacting substances must collide with sufficient energy to form the activated complex. | 4) add a catalyst and lower the activation energy | |

**Potential Energy / Kinetic Energy Graphs**




Example:

In the reaction A → B, sketch the Potential Energy (P.E.) graph and find the missing values.

P. E. of A = –60 kJ P. E. of B = -80 kJ

P. E. of Transition State = -30 kJ

Activation Energy = 30 kJ ΔH = –20 kJ

Is this endothermic or exothermic?

When a catalyst is added, the Potential Energy of the Transition State drops to –45 kJ. Sketch the new curve. Then find:

P. E. of A = -60 kJ P. E. of B = -80 kJ

P. E. of Transition State = –45 kJ

Activation Energy = 15 kJ ΔH = -20 kJ

Is this endothermic or exothermic?