# Determining Experimental Reaction Rate Law

**Rate Law** - communicates how the concentration of each reactant affects overall rate.

e.g. $\text{Rate} = k[A]^m[B]^n$ ← order (sum)

↑ initial ↑ rate constant

Example (see p. 544 - handout

A. Compare two trials where [A] changes but [B] stays same

$\frac{0.200}{0.100} = 2$ times ↘ $\frac{0.100}{0.100} = 1$ times

$\text{Rate} = \frac{4.00 \times 10^{-3}}{2.00 \times 10^{-3}} = 2$ times

So [A] affects reaction rate

$\Delta \text{Rate} \mid \Delta[A]^m$

$2 \neq 2^m$ $m=1$ first order for [A]

B. Effect of [B] - trials 2+3

$\Delta \text{rate} \mid \Delta[B]^n$

$4 \neq 2^n$ $n=2$ second order for [B]

Rate Law: $\text{Rate} = k[A][B]^2$ ✓

overall order $= m+n = 1+2 = \boxed{3}$

p. 545 #16-18 p. 555 #64, 69-71

Feb 24-5:41 PM