

PBL:

May I Take Your  
(Reaction) Order?

Assigned activities:

1. Determine the order of the reaction
2. Determine the rate constant at a few chosen temperatures
3. Determine the activation energy of the reaction

Extra Credit

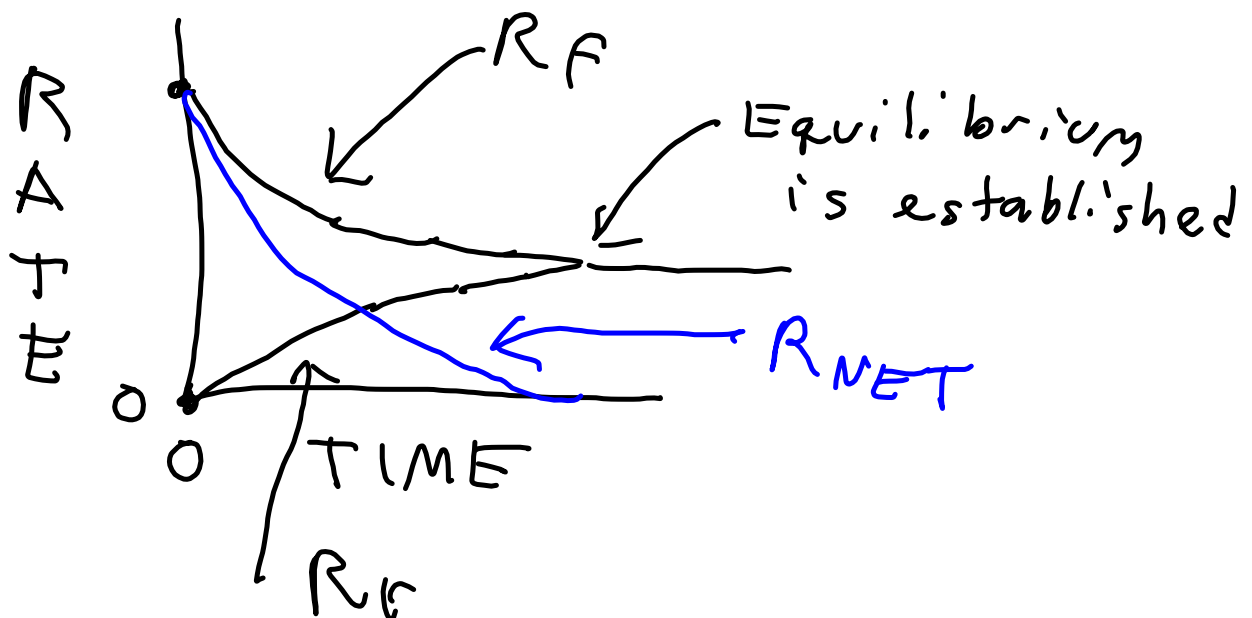
Determine the frequency factor (A)

# EQUILIBRIUM



$$R_{NET} = R_f - R_r$$

if  $R_f = R_r$ ,  $R_{NET} = 0$



# The Equilibrium Constant

Assume this reaction is elementary:



$$R_f = k_f [A]^a [B]^b$$

$$R_r = k_r [C]^c [D]^d$$

At equilibrium  $R_f = R_r$

$$\frac{k_f [A]^a [B]^b}{k_r} = \frac{k_r [C]^c [D]^d}{k_r}$$

$$\frac{\left(\frac{k_f}{k_r}\right) \cancel{[A]^a [B]^b}}{\cancel{[A]^a [B]^b}} = \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

$$\text{Note } \frac{k_f}{k_r} = K_c$$

↑ Equilibrium constant

$$K_c = \frac{[C]_{eq}^c [D]_{eq}^d}{[A]_{eq}^a [B]_{eq}^b}$$