Chapter 15 - Chemical Kinetics

- 2 theories - collision theory (effective collision)  
  transition state theory  
  transition state  
  potential energy diagram  
  activation energy

- factors affect reaction rate
  1. nature of reactant  
  2. concentration of reactants
    rate law expression depends on experiments + data  
    Rate = \( k [A]^x [B]^y \)  
    specific rate constant - units from overall order of rxn
  3. temperature (Arrhenius Eq. \( k = A e^{-\frac{E_a}{RT}} \))
    ln \( \frac{k_2}{k_1} \) = \( \frac{E_a}{R} \left( \frac{T_2 - T_1}{T_1 T_2} \right) \)
    \( R = 8.314 \text{ J/mol}\cdot\text{K} \)
  4. catalyst
    - reaction mechanism + rate law expression  
    - first order rate problems
    Memorize \( \ln \frac{A_t}{A_o} = -kt \quad k = \frac{0.693}{t\frac{1}{2}} \)  
    or equivalent