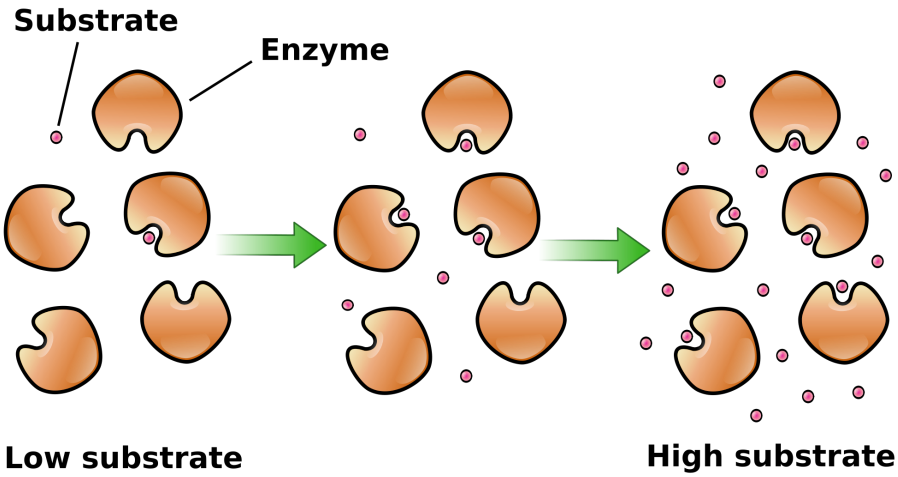
CONCEPT: ENZYME KINETICS

- Enzyme **kinetics** measure the activity of an enzyme
  - □ Measures _____ between substrate concentration and speed of enzyme reactions
    - Low substrate concentrations: less collision between enzyme and substrate = substrate is rate limiting
    - High substrate concentrations: more collision between enzyme and substrate = enzyme is rate limiting
  - □ It should be measured before any product has been formed

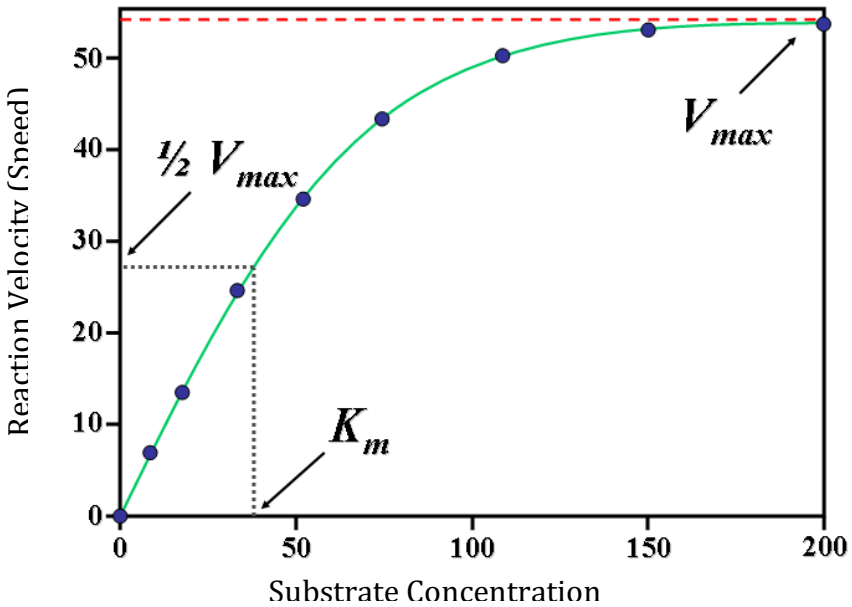
EXAMPLE: Collisions between substrate and enzyme happen when there is a higher substrate concentration



Representations of Enzymes Kinetics

- **V_{max}** and **K_m** (*Michaelis constant)* are measures of enzyme _____
  - □ **V_{max}** measures the maximum velocity (speed) of the enzymes reaction
    - Occurs as the substrate concentration is **saturated** which is when its reached it's upper limit of reactivity
    - High substrate concentrations: more collision between enzyme and substrate = enzyme is rate limiting
  - □ **K_m** measures the enzyme's function by determining the concentration of substrate needed to work half V_{max}
    - Small K_m enzyme binds tightly, Large K_m the enzyme binds weakly
  - □ Can be used to calculate the **turnover number** which is how rapidly a substrate molecule can undergo a reaction

EXAMPLE: Graph demonstrating relationship between V_{max}, K_m and concentration of substrate



PRACTICE:

1. If an enzyme is determined to have a low K_m what does that say about the reaction?
    a. The enzyme binds loosely to the substrate
    b. That the speed of the reaction is slow
    c. The enzyme binds tightly to the substrate
    d. That the speed of the reaction is fast

2. Which of the following terms describes how rapidly a substrate can undergo a reaction?
    a. Kinetics
    b. Turnover Number
    c. Saturation Rate
    d. Reaction Speed