- A and B are consumed throughout the course of the reaction
    - The concentration decreases as the reaction proceeds
    - a and b are the stoichiometric coefficients
- Must be measured experimentally
- A and B are consumed at equal rates
    - Because they consumed at an equal stoichiometric ratio, one can be measured to find the rate of the reaction
- The rate can be calculated using slope (rise/run) or (change in y/change in x)
- The rate of the reaction changes throughout the reaction
    - As A and B are consumed, their concentration decreases, meaning that the reaction rate slows down
    - Eventually reach a plateau where the reaction is complete or equilibrium has been reached

- To find the rate, we need to find the slope
- At any given time the rate can be determined by drawing a tangential line
- The slope allows us to determine how the rate changes during different parts of the reaction

- Loss of mass vs gain in volume for experimental measurements
    - Weighing pros and cons for your specific experiments is important
    - Measuring gas as a product is a simple way to study reactions

- The rates are affected by temperature, catalysts, surface area, and concentration
- We've discussed concentration and temperature a lot
- Surface area
    - Larger surface areas increase rate of the reaction
    - More surface area means more likely to collide with other molecules
    - Greater opportunity for successful collisions
- Catalyst
    - Catalyst is something that is not consumed during a reaction
    - It typically makes a reaction go faster
    - Catalysts can change during a reaction, but also change back - they cycle
    - They can lower the activation energy
    - They can break up reactions into more steps rather than a big jump, making the reaction more accessible
- Also light
    - Some reactions need light to run
    - The outcome of reactions can change depending on the presence of different types of light
    - Radical chemistry
- Pressure

    - Increasing pressure can speed up reactions by forcing molecules to a smaller area
    - Decreased pressure allows for molecules to spread out more, slowing reactions

- Reaction rates need to be adjusted so that their variables are proportional, this is where the rate constant is needed
- Rate constant is temperature dependent
    - Large = faster ; small = slower
- Units are flexible and change depending on the order of the reaction