

N12 - Equilibrium

Target: I can recall and describe what “dynamic equilibrium is”

N12 - Equilibrium

Quick Review

Chemical Equilibrium

Reversible Reactions

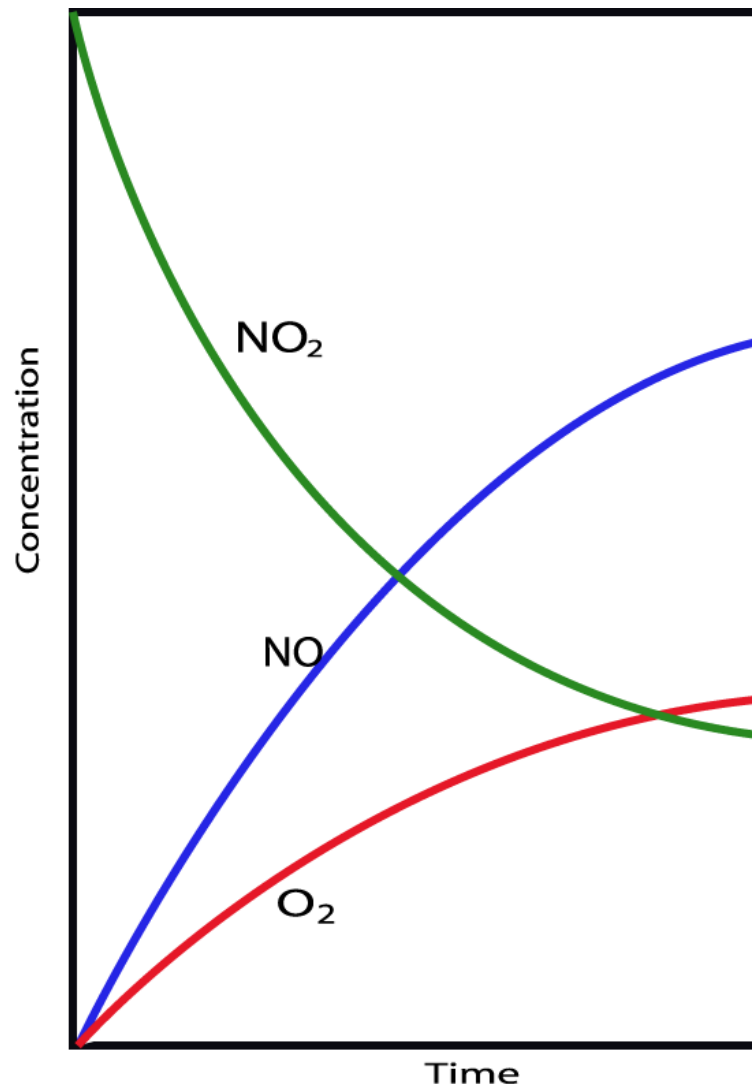
A chemical reaction in which the products can react to re-form the reactants

Chemical Equilibrium

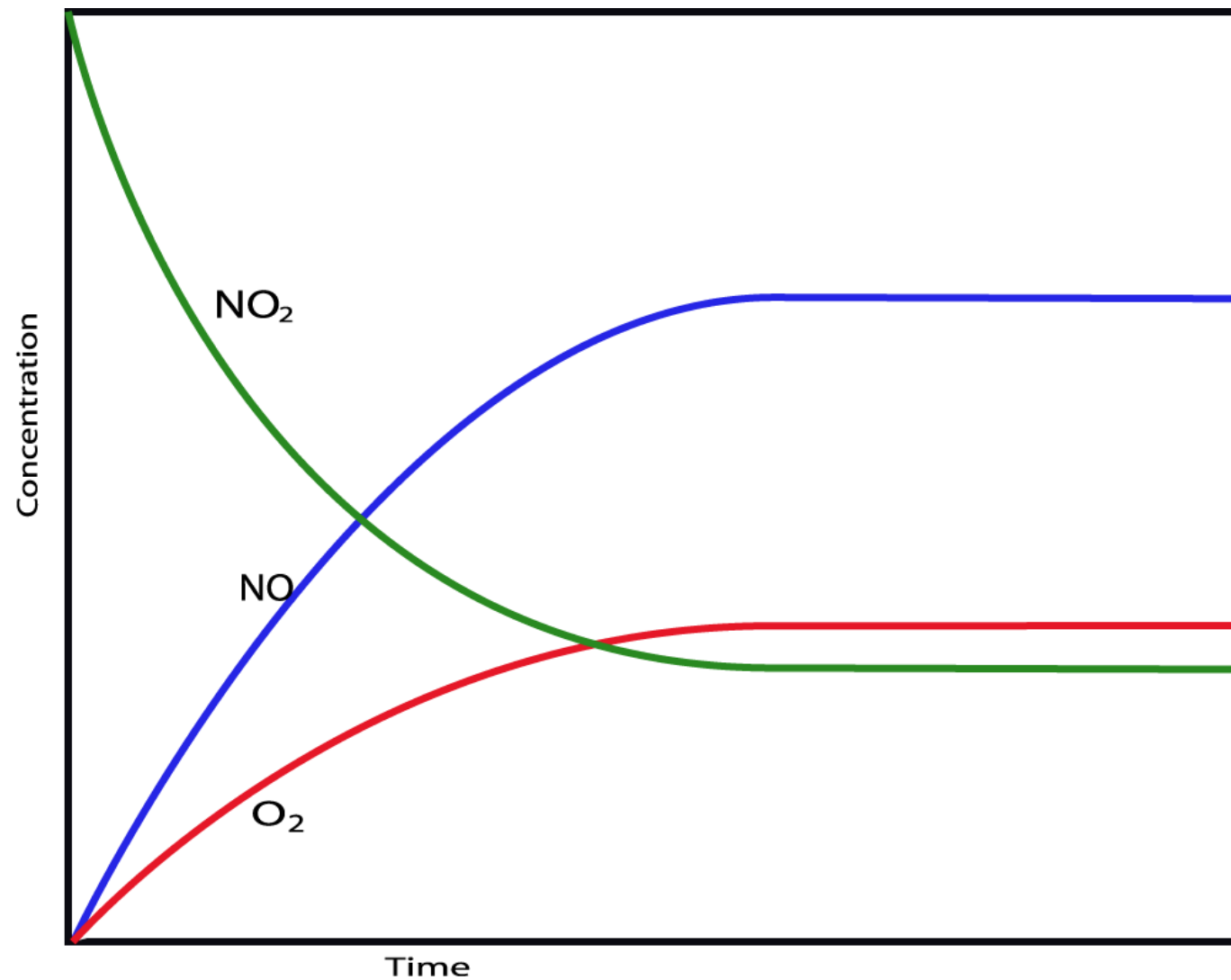
When the rate of the forward reaction equals the rate of the reverse reaction and the concentration of products and reactants remains unchanged



(\rightleftharpoons) indicates equilibrium in a chemical equation

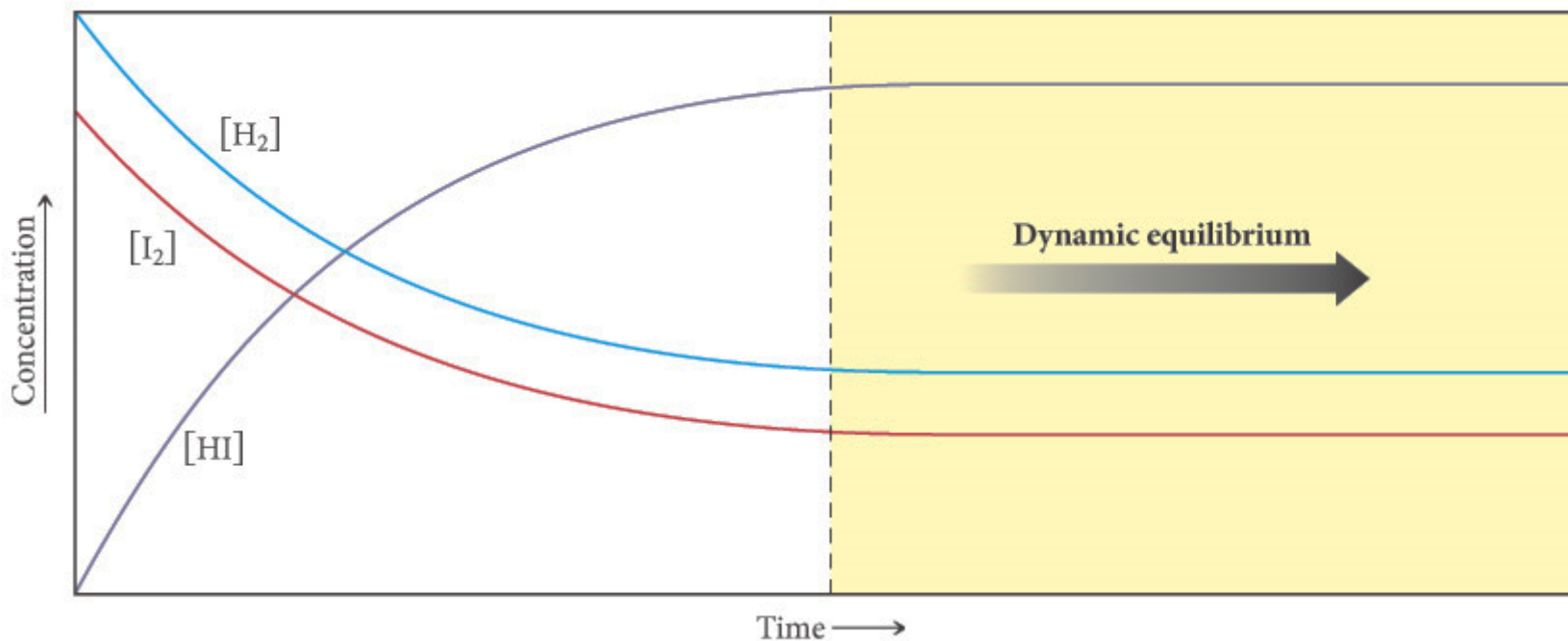


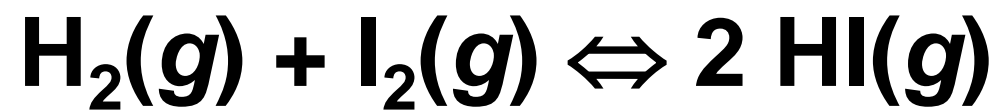
**Remember this from
Kinetics?**
**Why was it so important to
measure reaction rate at
the start of the reaction
(method of initial rates?)**





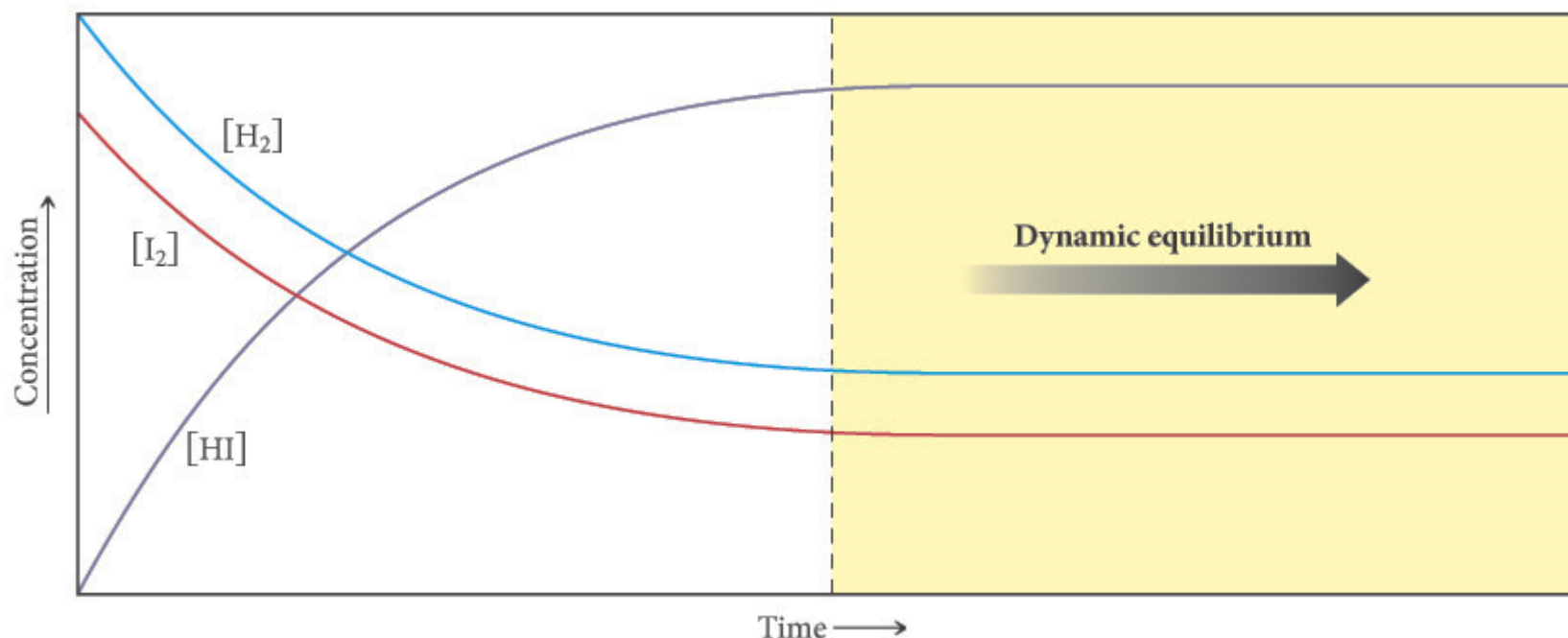
As the concentration of product increases and the concentrations of reactants decrease, the rate of the forward reaction slows down, and the rate of the reverse reaction speeds up.





At **dynamic equilibrium**, the rate of the forward reaction is equal to the rate of the reverse reaction.

The concentrations of reactants and products no longer change.

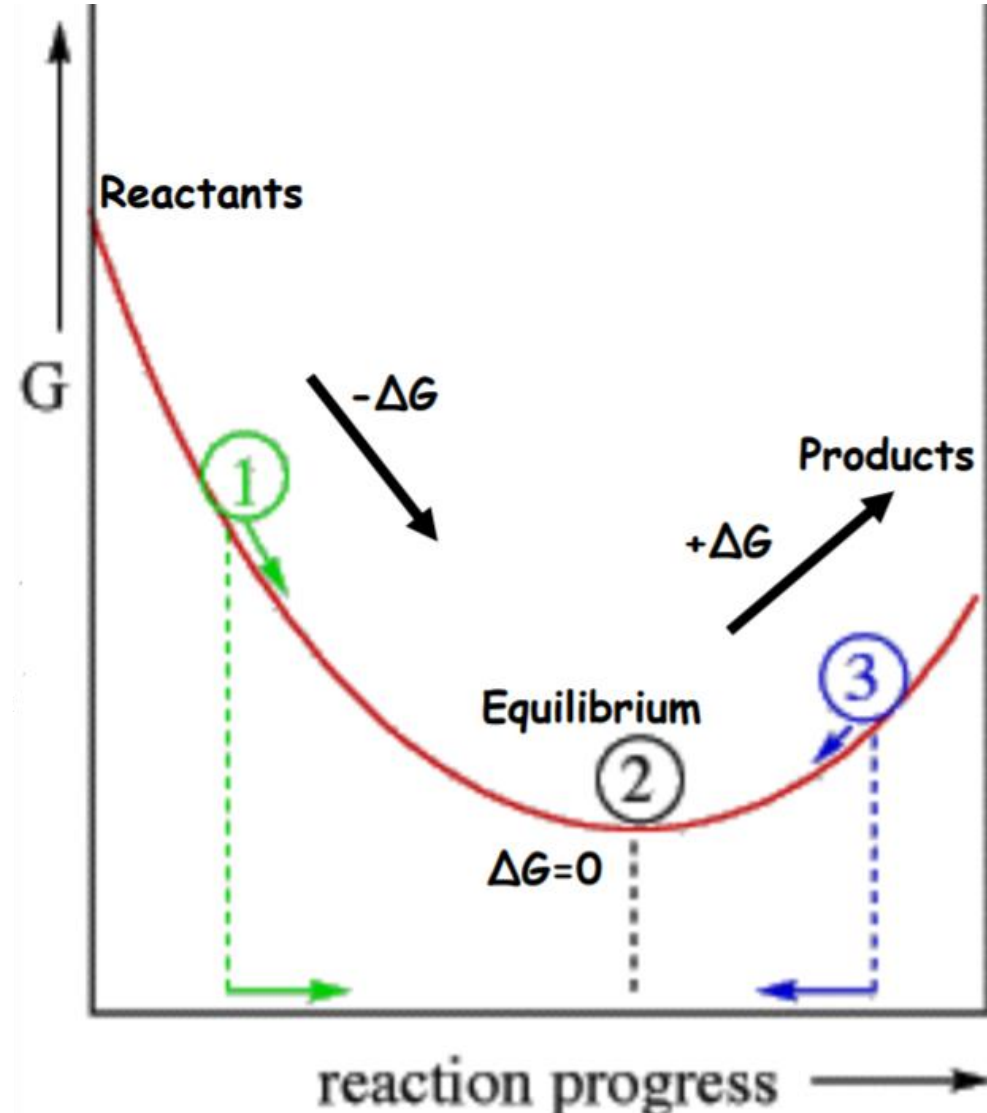


Remember Thermodynamics???

If $\Delta G = (-)$ then forward direction is favored.

If $\Delta G = (+)$ then reverse direction is favored.

$\Delta G = 0$ then at equilibrium!



Equilibrium \neq Equal Concentrations!

- The rates of the forward and reverse rxns are equal at equilibrium.
- But that does **NOT** mean the concentrations of reactants and products are equal.
- **Product Favored** - Some reactions reach equilibrium only after almost all the reactant molecules are consumed; we say the position of equilibrium favors the products.
- **Reactant Favored** - Other reactions reach equilibrium when only a small percentage of the reactant molecules are consumed; we say the position of equilibrium favors the reactants.

An Analogy:



<https://youtu.be/dUMmoPdwBy4>

YouTube Link to Presentation

<https://youtu.be/3Cz5orCdGMM>