

Chapter 15

2/6/19

The Concept of Equilibrium

A $A \rightarrow B$ vs. $A \rightleftharpoons B$

↳ What is the difference between single and double arrows?

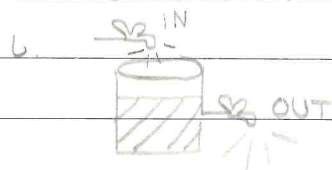
1. Shows if it goes to completion: $A \rightarrow B$

2. Goes back & forth: $A \rightleftharpoons B$

3. Tends toward B: $A \rightarrow B$

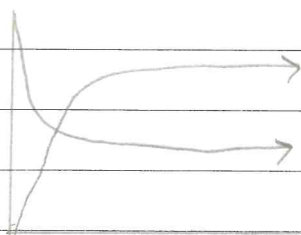
3. $N_2O_4(g) \rightarrow 2NO_2(g)$: can see color change, so one knows which way reaction proceeds

• **Equilibrium** the tube contains a mixture of products and reactants, the concentrations



1. The amounts of reactant and product no longer change over time $\rightarrow$ constant ratio

↳



2. At equilibrium, the rate of formation equals the rate of destruction
(rxn forward) (rxn reverse)

↳ System must be closed to reach equilibrium

When is it appropriate to use a single arrow? A double arrow?

A Fuel cell reaction: $2H_2(g) + O_2(g) \rightarrow 2H_2O + \text{energy}$

↳ So favored, single arrow appropriate