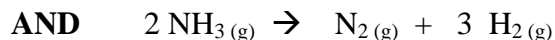
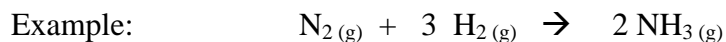


A. Intro

Not all reactions _____. Some reactions _____

So: when the reaction stops, the reaction vessel has: _____

***** **Some reactions are** _____



B. When Does A Reaction Stop? Ex: A + B → C + D

$$R_{\text{Forward}} = k_{\text{Forward}} [\text{A}] [\text{B}]$$

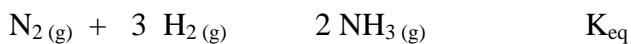
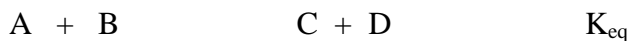
$$R_{\text{Reverse}} = k_{\text{Reverse}} [\text{C}] [\text{D}]$$

Stops When: _____

This is called: _____

C. Quantifying A Reaction: $K_{\text{Equilibrium}}$

D. Showing an Equilibrium Equation



E. Creating a K_{eq} equation

1. Only Use _____ because they can change their concentrations.

2. Turn _____ into _____

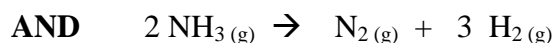
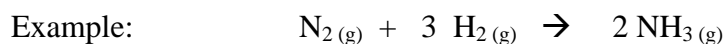
$$K_{\text{eq}} =$$

A. Intro

Not all reactions **complete to 100%** Some reactions **stop in the middle**

So: when the reaction stops, the reaction vessel has: **Products AND Reactants**

***** **Some reactions are Reversible**



B. When Does A Reaction Stop? Ex: $\text{A} + \text{B} \rightarrow \text{C} + \text{D}$

$$R_{\text{Forward}} = k_{\text{Forward}} [\text{A}] [\text{B}]$$

$$R_{\text{Reverse}} = k_{\text{Reverse}} [\text{C}] [\text{D}]$$

Stops When: **$R_{\text{Forward}} = R_{\text{Reverse}}$**

This is called **an equilibrium conditon**

C. Quantifying A Reaction: $K_{\text{Equilibrium}}$

$$k_{\text{Forward}} [\text{A}] [\text{B}] = k_{\text{Reverse}} [\text{C}] [\text{D}]$$

$$\frac{k_{\text{Forward}}}{k_{\text{Reverse}}} = \frac{[\text{C}] [\text{D}]}{[\text{A}] [\text{B}]}$$

$$K_{\text{eq}} = \frac{\text{[products]}}{\text{[reactants]}}$$

D. Showing an Equilibrium Equation



$$K_{\text{eq}} = \frac{[\text{C}] [\text{D}]}{[\text{A}] [\text{B}]}$$



$$K_{\text{eq}} = \frac{[\text{NH}_3]^2}{[\text{N}_2] [\text{H}_2]^3}$$

E. Creating a K_{eq} equation

1. Only Use **gases and liquids** because they can change their concentrations.
2. Turn **coefficients (NIF)** into **exponents**