AR Chemistry Notes Name____________________________________ M T 1 2 5
Equilibrium 1

A. Intro

Not all reactions ______________________. Some reactions ___________________________

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

******* Some reactions are ___________________________**

Example: $N_{2\,(g)} + 3\ H_{2\,(g)} \rightarrow 2\ NH_{3\,(g)}$

AND $2\ NH_{3\,(g)} \rightarrow N_{2\,(g)} + 3\ H_{2\,(g)}$

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

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

Stops When: ____

This is called:____

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

D. Showing an Equilibrium Equation

A + B C + D K_{eq}

$N_{2\,(g)} + 3\ H_{2\,(g)}$ $2\ NH_{3\,(g)}$ K_{eq}

E. Creating a K_{eq} equation

1. Only Use _____________________________ because they can change their concentrations.
2. Turn ___________________________ into _________________________

$K_{eq} =$

AR Chemistry Notes Name____________________________________ M T 1 2 5
Equilibrium 1

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**

Example: $N_{2\,(g)} + 3\ H_{2\,(g)} \rightarrow 2\ NH_{3\,(g)}$

AND $2\ NH_{3\,(g)} \rightarrow N_{2\,(g)} + 3\ H_{2\,(g)}$

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

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

Stops When: $\mathbf{R_{Forward} = R_{Reverse}}$

This is called **an equilibrium conditon**

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

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

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

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

D. Showing an Equilibrium Equation

$A + B \leftrightarrow C + D$ $\qquad K_{eq} = \frac{[C]\,[D]}{[A]\,[B]}$

$N_{2\,(g)} + 3\ H_{2\,(g)} \leftrightarrow 2\ NH_{3\,(g)}$ $\qquad K_{eq} = \frac{[NH_3]^2}{[N_2]\,[H_2]^3}$

E. Creating a K_{eq} equation

1. Only Use **gases and liquids** because they can change their concentrations.

2. Turn **coefficients (NIF)** into **exponents**