Name:_____
Name:_____
Blk:_____Date:_____

Chemistry 12
EQUILIBRIUM Lesson #1

Read pgs 36-39 to answer the following:

Equilibrium:

_____
_____
_____

In order for EQUILIBRIUM to be possible the products must not be able to escape as they are needed for the REVERSE reaction. Therefore: _____
_____.

A **CLOSED SYSTEM**:_____.

ONLINE DEMONSTRATION:

TWO sealed glass tubes containing a mixture of a **red-brown gas (NO_2)** and a **colourless gas (N_2O_4)** are observed. The colour is an identical medium red-brown in each tube and there is no visible change in colour of the contents as time passes at room temperature.

When one tube is placed in a beaker of **boiling water** for a minute, the contents of the tube become much **darker red-brown** in colour. When the other tube is placed in a **beaker of ice cold water**, the colour quickly disappears and the contents of the tube remain **colourless**.

When the hot and cold tubes are taken out of the beakers and placed side by side, the tubes have an identical medium red-brown colour when they reach room temperature.

a . The gases are involved in this reversible reaction: $N_2O_4\ (g) <---> 2\ NO_2\ (g)$
What evidence exists that the forward and reverse rates are EQUAL at room temperature?

b. Can temperature changes effect an equilibrium reaction? How do you know this?

c. What evidence shows that the forward reaction rates and the reverse rates are equal at 100 ºC? If the temperature were raised above 100 ºC what would you expect to happen to the colour?

d. The balanced equation in part (a) should also show ENERGY . Consider what happened to the colour when the tube was heated. Is the reaction endothermic or exothermic as written, explain.

e. Which gas is predominantly present at low temperatures? Which gas is predominantly present at high temperatures? How would you describe the chemical composition in a tube when it was at room temperature?

f. If one tube were filled with pure NO_2 (g) and another tube with pure N_2O_4 (g), what might be true of the colours you would expect to see in the tubes after they sit for a minute at the same temperature? What evidence do you have that your prediction should occur?

THE FOLLOWING CONCLUSIONS CAN BE DRAWN FROM THE ABOVE DEMONSTRATION:

1.

2.

3.

4.

MACROSCOPIC
MICROSCOPIC

DYNAMIC EQUILIBRIUM:_____
_____.

*FROM NOW ON WHENEVER YOU SEE THE TERM **"EQUILIBRIUM"** IT IS IMPLYING A **"DYNAMIC EQUILIBRIUM"***

SEAT WORK/HOMEWORK : Exercises 1, 3-5 pgs 37 + 39
PLO's: D1, D4, D5 and D6.