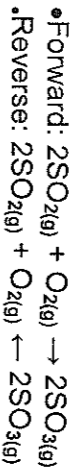**Objectives:**
- explain how different factors affect solubility, using the concept of equilibrium
- explain the roles of evidence, theories and paradigms in LeChatelier's Principle
- predict the favourability of reactant or products in a reversible reaction, on the basis of the magnitude of the equilibrium constant.
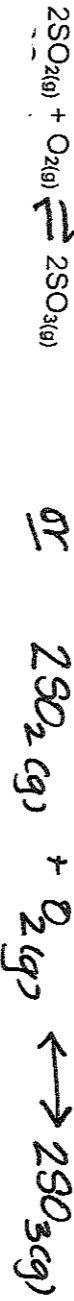- write equilibrium constant expressions

Notes in class-Take down what you can in class, use shorthand if you need to

Reversibility:

- not all reactions go to completion as we have previously assumed

- Forward: $2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$
- Reverse: $2SO_{2(g)} + O_{2(g)} \leftarrow 2SO_{3(g)}$

Use a double arrow
$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$ or $2SO_{2(g)} + O_{2(g)} \longleftrightarrow 2SO_{3(g)}$

Dynamic Equilibrium:

Characteristics:

- equal rates; rate of forward reaction is equal to rate of reverse reaction.

- no net change in macroscopic properties ex; color, density...

- closed system.

3 types:
① State equilibrium - rate of condensation = rate of evaporation.

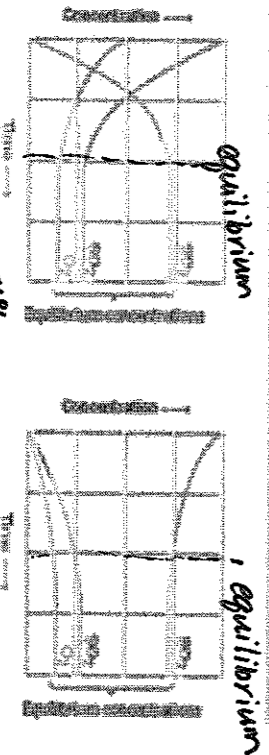② Solution equilibrium - rate of dissolving = rate of crystallization.

dissolving $\xrightarrow{}$ crystallizing
NaCl

③ Chemical Equilibrium
- rate of formation of reactants = rate of formation of products.

Equilibrium Position

products fav.	reactants favored
$\rightleftharpoons$	$\rightleftharpoons$
>50%	<50%
$\rightleftharpoons$	$\rightleftharpoons$
75%	15%

Graphs of Equilibrium

equilibrium

reaction: $2SO_2 + O_2 \underset{>50\%}{\rightleftharpoons} 2SO_3$ or $\rightleftharpoons$

equilibrium

reaction: $2SO_3 \underset{<50\%}{\rightleftharpoons} 2SO_2 + O_2$ or $\rightleftharpoons$