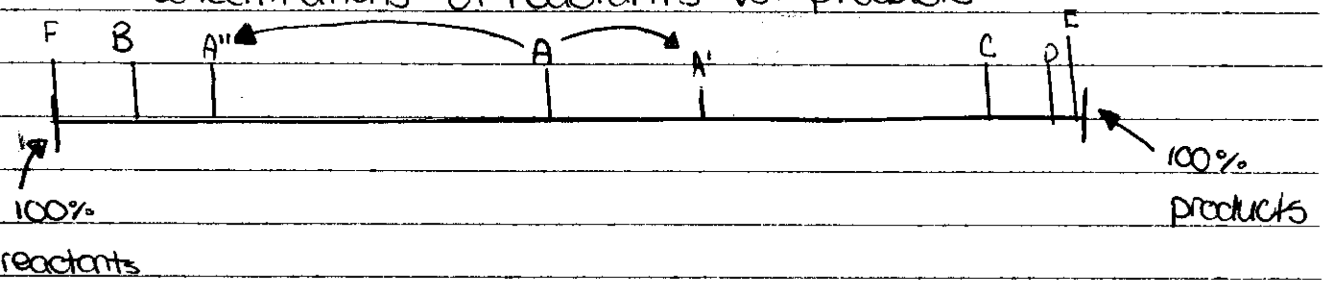
Le Chatelier's Principle

Equilibrium Position: a statement about the relative "concentrations" of reactants vs. products



A: Equilibrium position lies in the middle
B: Lies to the left (ie. lies towards reactants 90% reactants vs. 10% products)
C: lies to the right
D: lies far to the right
E: lies very far to the right
F: lies very very far to the left

A shift in position would be described as a shift to the left or a shift to the right.

A → A' a shift to the right ↑ products, ↓ reactants
A → A'' a bigger shift to the left ↓ products, ↑ reactants

Le Chatelier's Principle (LCP): when a stress (outside change) is imposed on an equilibrium, the equilibrium will shift position in such a way as to minimize (but not negate) the effect of the stress. Equilibria fight back

The stress must be in molecular terms, molecular perspective
- add a substance ⇒ increase the concentration of...
- increase temp. ⇒ adding heat energy, added Q (↑Q)
  (↳ measure of the average of kinetic energy)
- decrease temp. ⇒ removing heat energy ↓Q
- increase in volume ⇒ ↓ Pressure (also ↓ concentration)
- decrease in volume ⇒ ↑P

Nilroy

LCP format

Stress: imposed change (see above)
Response: reverse of the stress
How: how the equilibrium will monage to respond
- exothermic / endothermic reaction
- make mass / less moles of gas
- produce / use a partical substance

Direction: shift to the left or right (in order to accomplish the how)
Effect: Good luck!

eg. $H_2O(g) \rightleftharpoons H_2O(l)$ $\Delta H = -$

Shifts
Increase - L↑
Decrease - R↓

Increase the temp.
S: ↑Q
R: ↓Q
H: endothermic reaction
D: shift to the left
E: ↑[$H_2O(g)$]

Decrease the temp.
S: ↓Q
R: ↑Q
H: exothermic reaction
D: shift to the right
E: ↓[$H_2O(g)$]

Decrease Volume
S: ↑P
R: ↓P
H: ↓ amount of gas
D: shift to the right
E: ↓ n $H_2O(g)$ ↑[$H_2O(g)$]*
(n ← amount)

Increase Volume
S: ↓P
R: ↑P
H: ↑ amount of gas
D: shift to the left
E: ↑ n $H_2O(g)$ ↓[$H_2O(g)$]*

* Just a thought $C = \frac{n}{V}$ *

#8 + 9	catalyst (speeds up) * no effect *

if you add something that is not in equilibrium equation also no effect.