

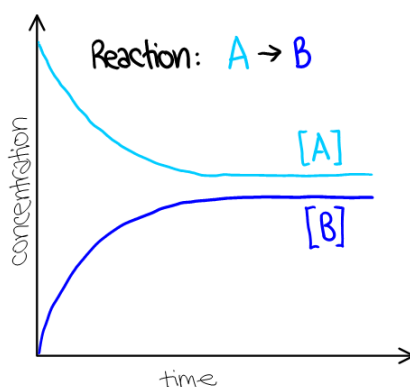
7.1 – Dynamic Equilibrium

7.1.1 - Outline the characteristics of chemical and physical systems in a state of equilibrium

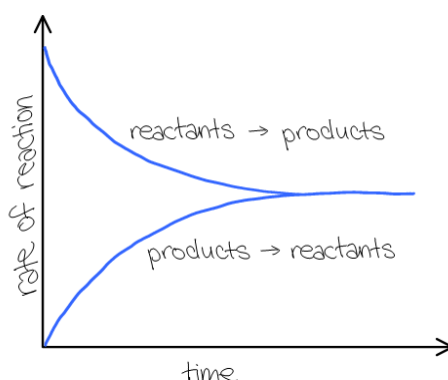
Open system – When a reaction occurs in an unsealed container

Closed system – When a reaction occurs in a sealed container, and it is possible to reach equilibrium.

When a reaction takes place, the products are then able to revert back to their reactants, so that the reaction is occurring **both forwards and backwards**. At the beginning of any reaction, the particles in the highest concentration are the reactants. As more of the products are formed, this concentration decreases, while the concentration of the product increases.



Since the concentration of reactants decreases, this also decreases the probability of a collision between the particles, thus slowing the **rate of reaction**. The inverse is also true for the products.



Looking back at the first graph, we can see that the reactants and products reach a point in time when the reaction appears to have stopped. However, as we see in the second graph, the reactions do not cease, but in fact are continuing at the same rate. All the macroscopic properties of the reaction will be constant and has reached a state of **dynamic equilibrium**.

The characteristics of dynamic equilibrium are:

- The forward and reverse reactions are happening at the **same rate**
- Occurs for physical systems also (i.e. water vapour changing state to liquid water)
- Depending on factors such as temperature and pressure, the reaction may favour the products or the reactants.

