

Equilibrium Notes #1

Reactants → **Products**

Single Arrow Chemical Changes:

- Common notation used in the first-year course.
- Represents a “one-way ticket” from reactants to products

To achieve this, a driving force must be present to push the reaction to completion.

Examples of common “driving forces”

- Precipitate formation
- Gas formation (bubbles) *remove “free-swimming ions” from the solution.*
- Formation of water molecules
- Presence of a strong acid or strong base (more details next month)

Without a driving force, we have a reversible reaction, and we use a double arrow notation.

Reactants ⇌ **Products**

Equilibrium Factoids:

1. Once equilibrium has been established, the forward rate = reverse rate.
2. Once equilibrium has been established, the chemical system does not shut down or stop. Dynamic process, but there are no observable changes.
3. Once equilibrium has been established, the concentrations of reactants and products remain constant.
4. Once equilibrium has been established, we have a fixed ratio of products : reactants. We call this the equilibrium constant, and its symbol is K or K_{eq}.

$$K = \frac{[\text{Products}]}{[\text{Reactants}]}$$

Consider this example: **2 A + B ⇌ 3 C + 2 D** **K =**