



## CHEM 160

## LE CHATELIER

**Definition:** Any change in equilibrium conditions will cause the system to shift in such a way as to counteract that change and reestablish equilibrium

**In other words,** if something is added or taken away from the system, the reaction will shift to create more product or reactant.

The following are factors that can be changed, and the corresponding change of the reaction:

- Concentration:
  - Reactants
    - Increasing reactants causes the reaction to shift forward (towards products)
    - Decreasing reactants causes the reaction to shift backwards (towards reactants)
  - Products
    - Increasing products causes the reaction to shift backwards
    - Decreasing products causes the reaction to shift products
- Temperature
  - Endothermic
    - Increasing temperature causes the reaction to shift forward
    - Decreasing the temperature causes the reaction to shift backward
  - Exothermic
    - Increasing temperature causes the reaction to shift backward
    - Decreasing the temperature causes the reaction to shift forward
- Volume
  - Moles of products > moles of reactants
    - Increasing volume causes reaction to shift forward
    - Decreasing volume causes reaction to shift backward
  - Moles of products < moles of reactants
    - Increasing volume causes reaction to shift backward
    - Decreasing volume causes the reaction to shift forward
  - If moles of products = moles of reactants, a change in volume will have no effect
- Pressure
  - Moles of products > moles of reactants
    - Increasing pressure causes reaction to shift backward
    - Decreasing pressure causes reaction to shift forward
  - Moles of products < moles of reactants
    - Increasing pressure causes reaction to shift forward
    - Decreasing pressure causes reaction to shift backward
  - If moles of products = moles of reactants, a change in pressure will have no effect

