

## LeChatelier and Temperature

Raising the temperature on an equilibrium system causes the system to try to absorb the added energy. Reducing the temperature causes the system to try to restore the energy. You must, therefore, consider whether the reaction is **endothermic** or **exothermic**.

### **Endothermic Reactions:**

For an endothermic reaction, energy is **absorbed** when the reaction runs in the **forward direction**. You can think of energy as a reactant.

Reactants + **Energy** <----> Products

If the temperature is raised, the system responds by converting reactants to products and absorbing the added energy in the process. Similar to when a reactant concentration increases, the system shifts toward products to consume the added energy. If the temperature is lowered, the opposite happens.

The **equilibrium constant increases** when the temperature is raised on an endothermic reaction.

### **Exothermic Reactions:**

For an exothermic reaction, energy is **absorbed** when the reaction runs in the **reverse direction**. You can think of energy as a product.

Reactants <----> Products + **Energy**

When the temperature is raised, the system responds by converting products to reactants and absorbing the added energy in the process. Similar to when a product concentration increases, the system shifts toward reactants to consume the added energy. If the temperature is lowered, the opposite happens.

The **equilibrium constant decreases** when the temperature is raised on an exothermic reaction.

**Temperature** is the only equilibrium variable that changes the value of the equilibrium constant.