

## 2.4 Chemical Reactions

### KEY CONCEPT

**Life depends on chemical reactions.**



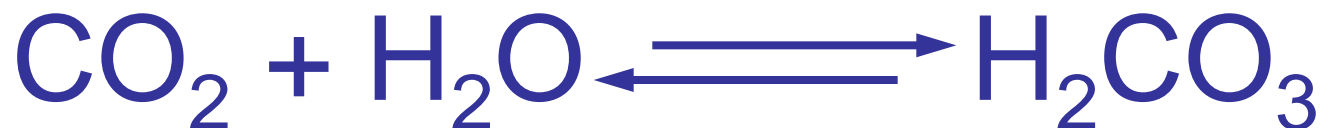
## 2.4 Chemical Reactions

### ▶ Bonds break and form during chemical reactions.

- Chemical reactions change substances into different ones by breaking and forming chemical bonds.
  - Reactants are changed during a chemical reaction.
  - Products are made by a chemical reaction.

## 2.4 Chemical Reactions

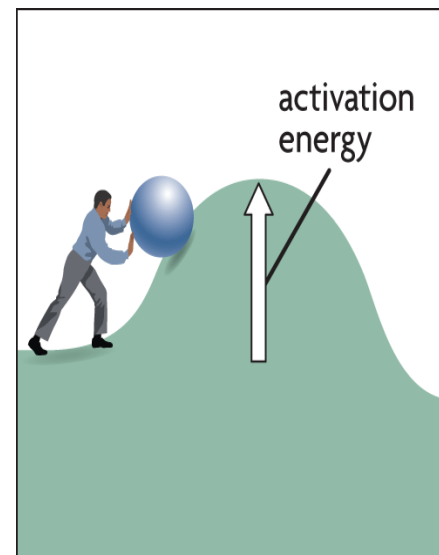
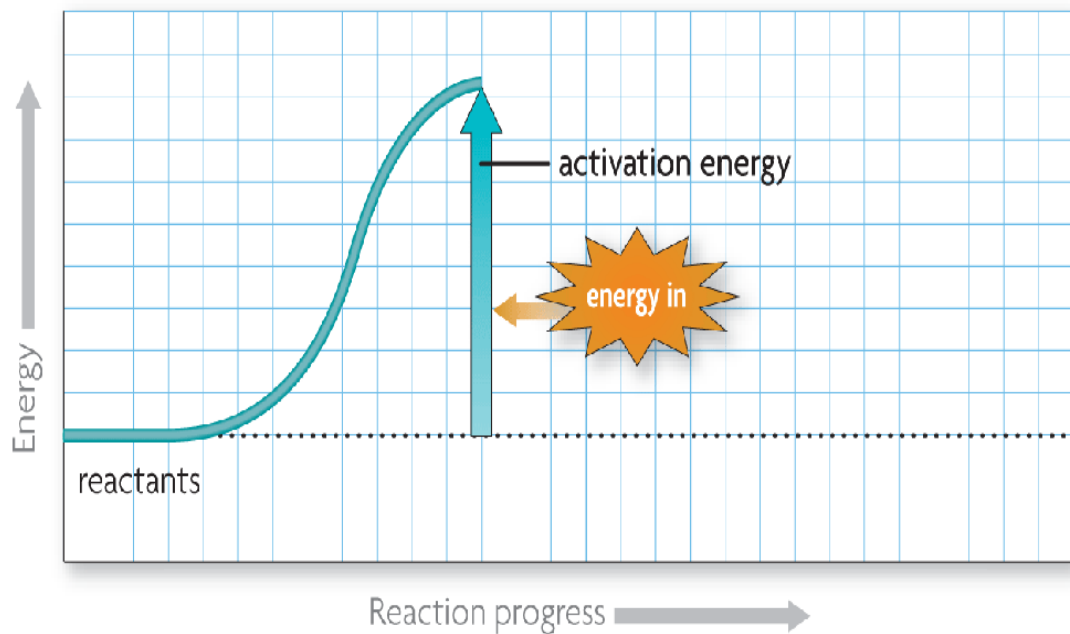
- Bond energy is the amount of energy that breaks a bond.
  - Energy is added to break bonds.
  - Energy is released when bonds form.
- A reaction is at equilibrium when reactants and products form at the same rate.



## 2.4 Chemical Reactions

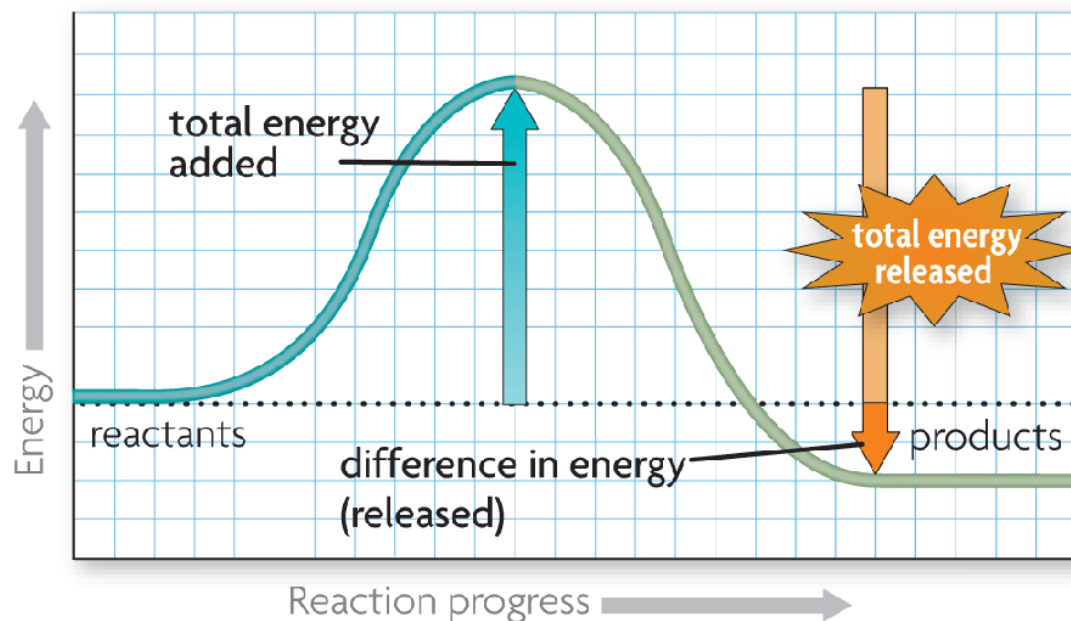
### ▶ Chemical reactions release or absorb energy.

- Activation energy is the amount of energy that needs to be absorbed to start a chemical reaction.



## 2.4 Chemical Reactions

- Exothermic reactions release more energy than they absorb.
  - Reactants have higher bond energies than products.
  - Excess energy is released by the reaction.



## 2.4 Chemical Reactions

- Endothermic reactions absorb more energy than they release.
  - Reactants have lower bond energies than products.
  - Energy is absorbed by the reaction to make up the difference.

