

Name: KEY Official Class: _____ Date: _____
 Teacher: _____ Period: _____ Class: _____

Heat of Reaction (a.k.a Enthalpy)

YOYO: Directions: Read the claim. Write 1 sentence describing something you already know that relates to the claim below (Evidence) [HINT: the emoji to the right.] Then, write 2 sentences explaining how your evidence can be used to either support of claim stated below (Reasoning).



- **Claim:** Breaking bonds are considered to be endothermic processes and forming bonds are considered to be exothermic processes:

- **Evidence:**

○ Break Absorb Release Form

- **Reasoning:**

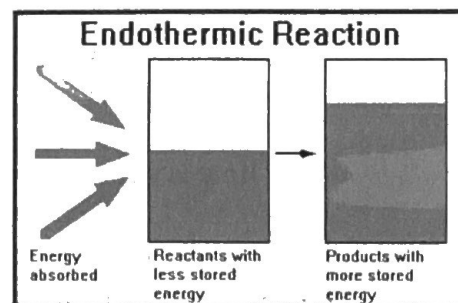
○ In order for a bond to break, energy must be absorbed. An endothermic process is when energy is absorbed. Oppositely, when bonds form, energy is released. Exothermic processes occur when energy is released.

Heat of Reaction

- The amount of heat energy lost or gained throughout the reaction
- $\Delta H_{\text{heat of reaction}} = H_{\text{products}} - H_{\text{reactants}}$
- $\Delta H =$ enthalpy

Endothermic Reactions

- Heat is absorbed by reactants
 - Energy is stored in chemical bonds of the products
 - ΔH is (+)
 - $A + B + \text{energy} \rightarrow C + D$

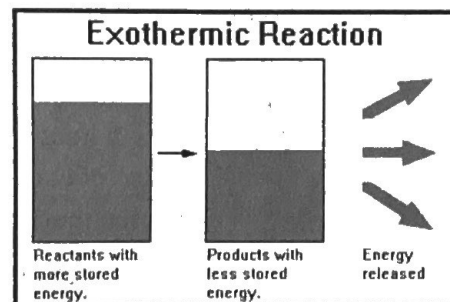


Endothermic Example $A + B \rightarrow C$

- If $H_A = 40$ kJ and $H_B = 20$ kJ, then the reactants have a total of 60 kJ
- If $H_C = 110$ kJ, then 50 kJ of heat must have been absorbed by the reactants.
 - $(110 - 60 = 50 \text{ kJ})$
 - Rewritten: $A + B + 50 \text{ kJ} \rightarrow C$
- Total energy on both sides are equal (law of conservation of energy)

Exothermic Reactions

- Heat is released as a product
 - ΔH is (-)
 - More stable reaction
 - Spontaneous
 - $A + B \rightarrow C + D + \text{energy}$
 - Energy is written as a product



Exothermic Example $A + B \rightarrow C$

- If $H_A = 60$ kJ and $H_B = 40$ kJ, then the reactants have a total of 100 kJ
- If $H_C = 30$ kJ, then 70 kJ of heat must be released as a product
 - $(100 - 30 = 70)$
 - Rewritten: $A + B \rightarrow C + 70 \text{ kJ}$
- Total energy on both sides are equal (law of conservation of energy)

