

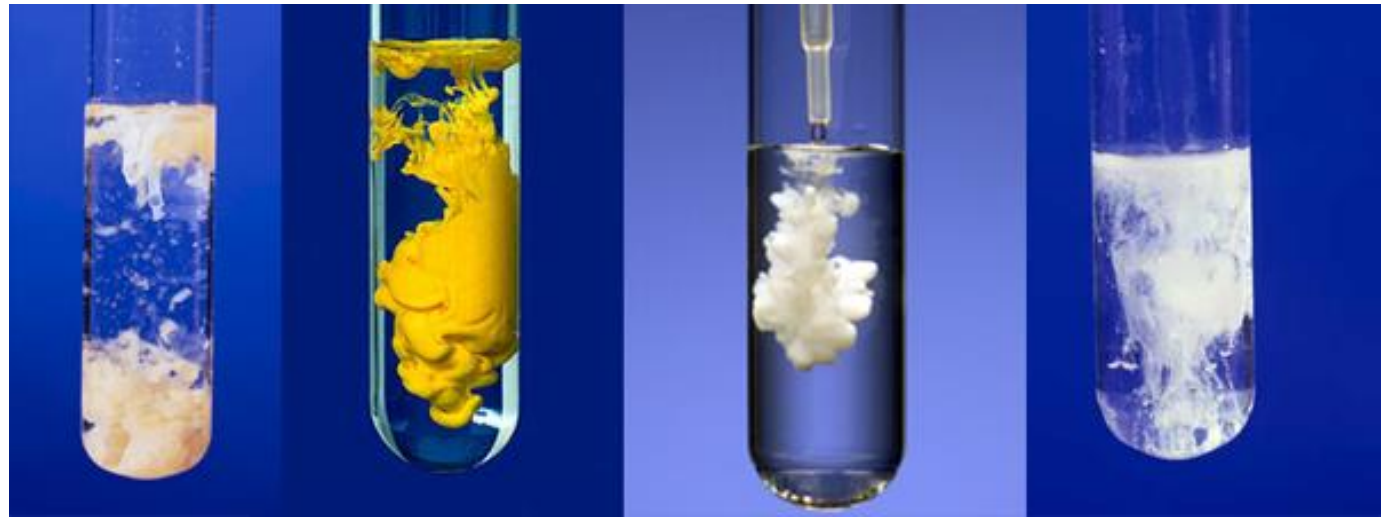
[1.7] - Types of Reactions



Chemical Changes

Any one of the following things may indicate that a chemical change has occurred:

- 1. Change in color**
- 2. Energy is released or absorbed**
- 3. Gas is produced**
- 4. Precipitate (solid) is formed in solution**

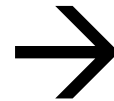


Synthesis Reaction

- “Synthesis” means to “to make”
- A reaction in which **two reactants combine** to make a larger, more complex product

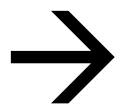
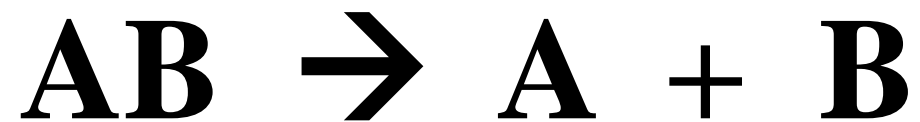


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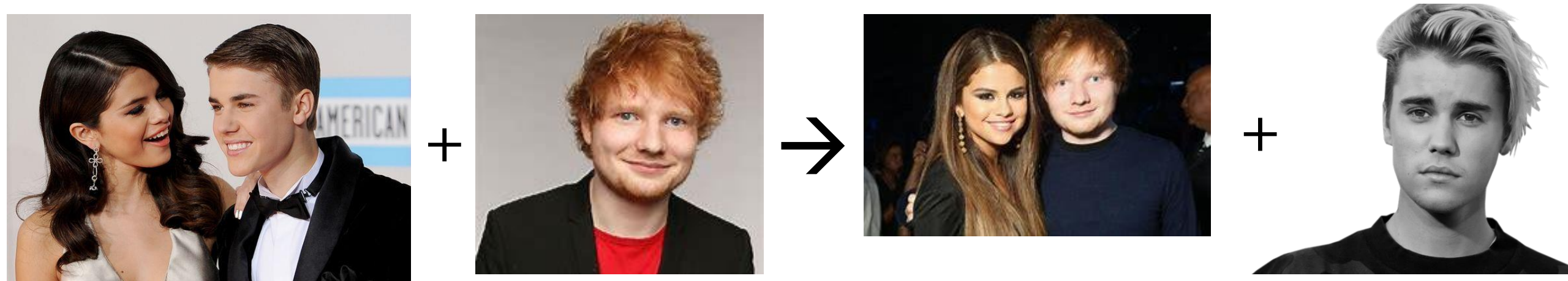
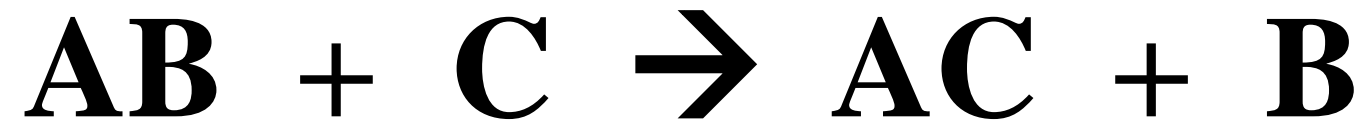
Decomposition Reaction

- “Decompose” means to “break down”
- A reaction in which a large or more **complex compound breaks down** to form two (or more) simpler products



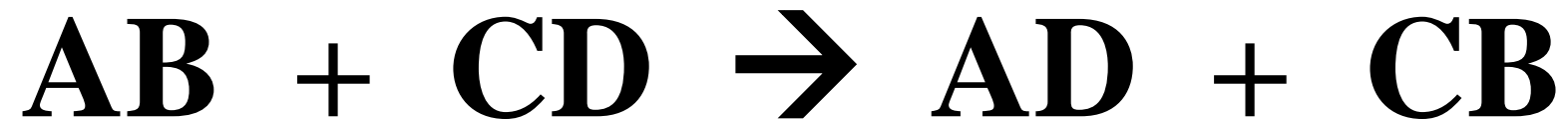
Single Replacement Reaction

- A reaction in which an element **replaces** another element in a compound, producing a new compound and a new element



Double Replacement Reaction

- A reaction in which elements in two compounds displace each other or trade places, producing two new compounds



+



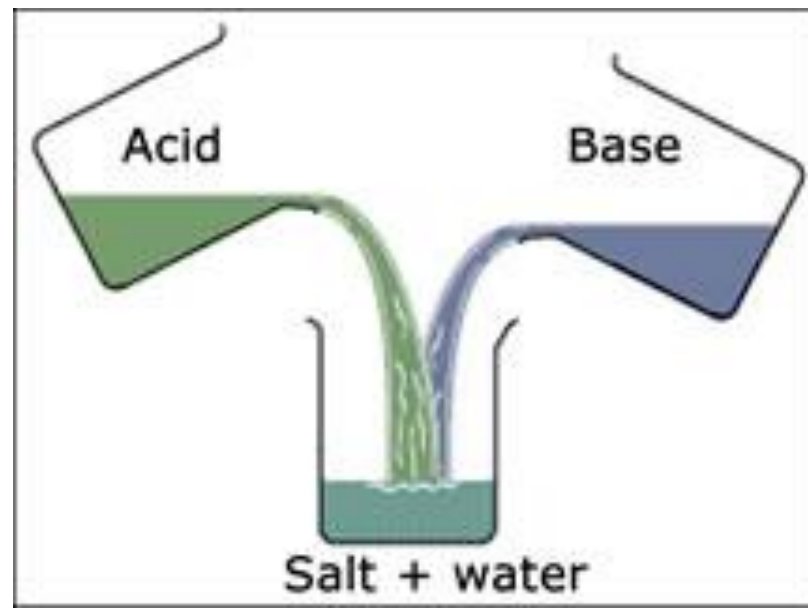
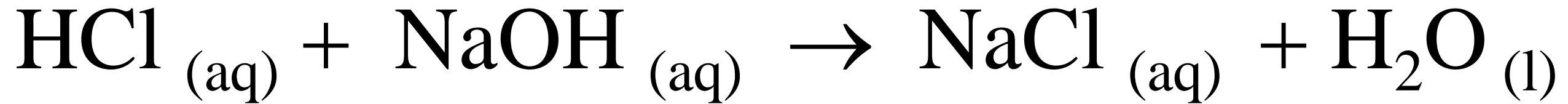
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Neutralization Reaction

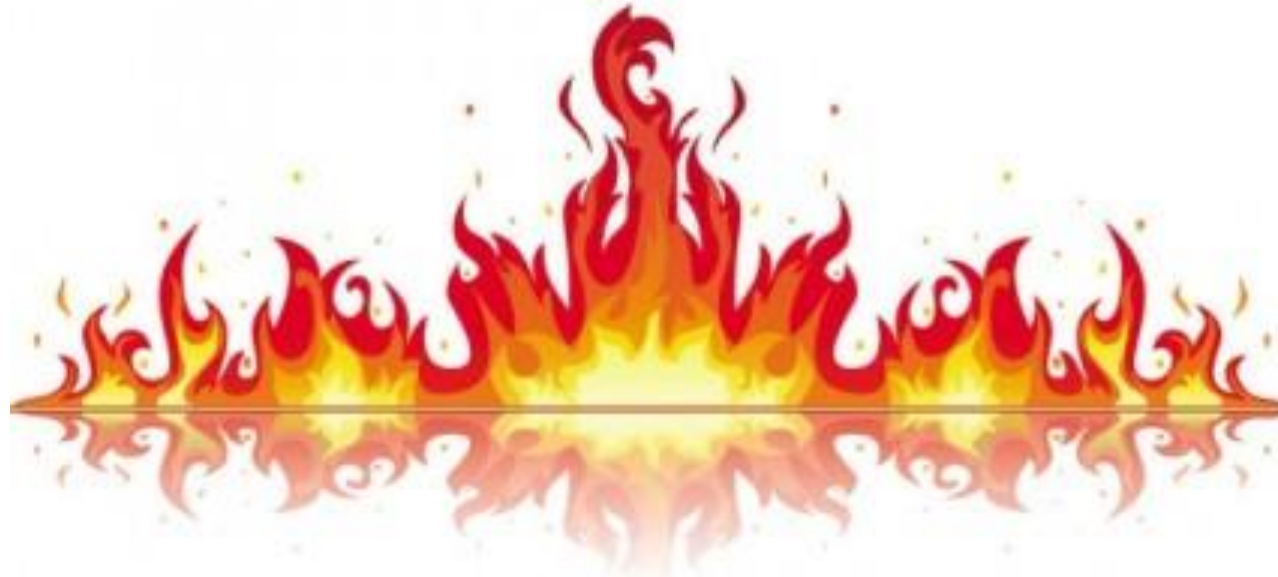
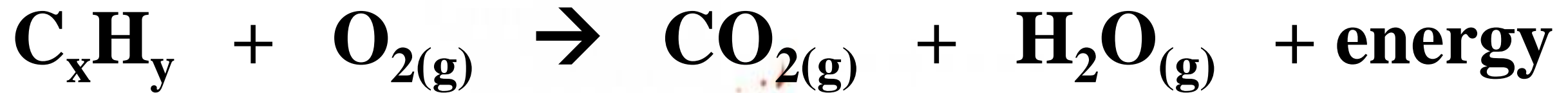
- A chemical reaction that involves **acid** & **base** to produce **water** and **salt**

Acid + Base → Water + Salt



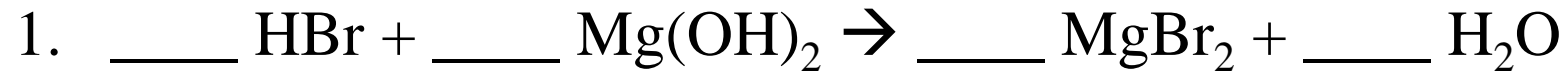
Combustion Reaction

- A chemical reaction in which fuel (**hydrocarbon**) burns in **oxygen gas** to produce **carbon dioxide, water and energy**
- **Hydrocarbons:** Molecular compounds containing the elements carbon and hydrogen

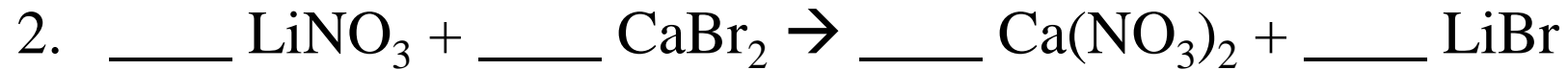


Practice Problem #1

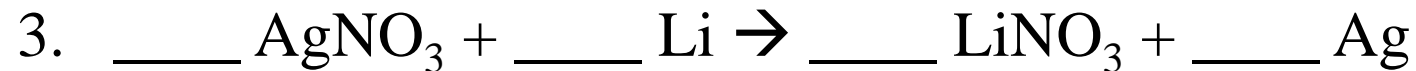
Determine the products of the following reactions, balance the equation & list what type of reaction it is:



Type of reaction: _____



Type of reaction: _____



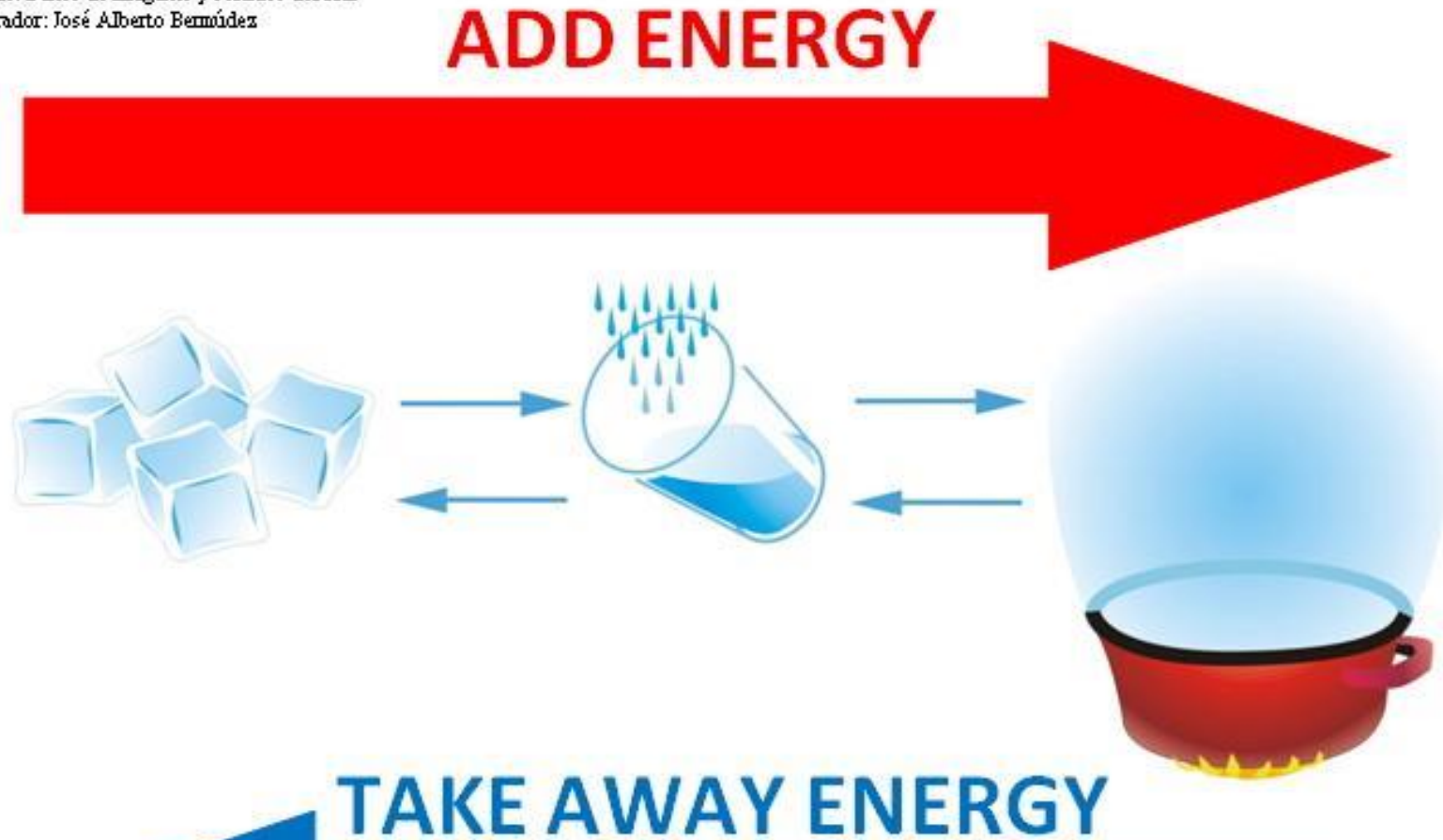
Type of reaction: _____



Type of reaction: _____

Energy Changes

Fuente: Banco de imágenes y sonidos del ITE
Ilustrador: José Alberto Bermúdez



Energy Changes

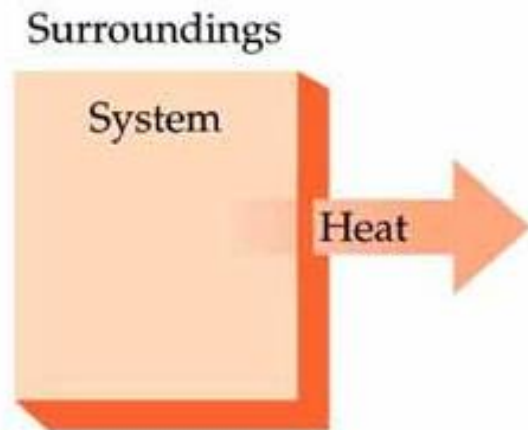
- **Energy** is measured in Joules (J) or kilojoules (kJ)
- **Enthalpy**: change in energy



Total
ENERGY
=
Joules (J)

Reactions with Energy Changes

- **Exothermic Reaction:** Gives off (releases) heat to its surroundings. Heat **EXITS** the reaction



- Enthalpy is **negative**, showing losing energy

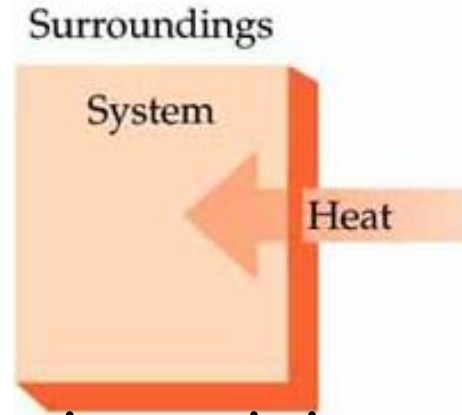


- Energy can be written as a **product**.

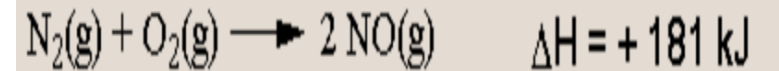


Reactions with Energy Changes

- **Endothermic Reaction:** Absorbs heat from its surroundings. Heat **ENTERS** the reaction

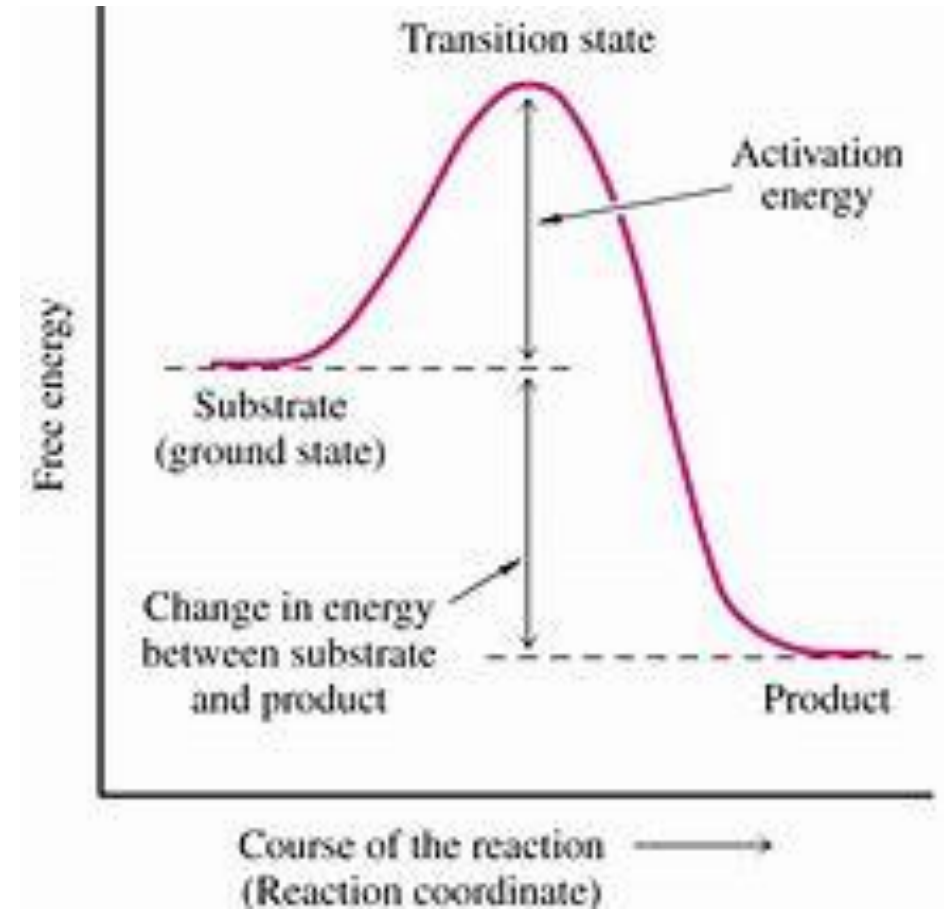


- Enthalpy is **positive**, showing gaining energy
- Energy can be also be written as a **reactant**.

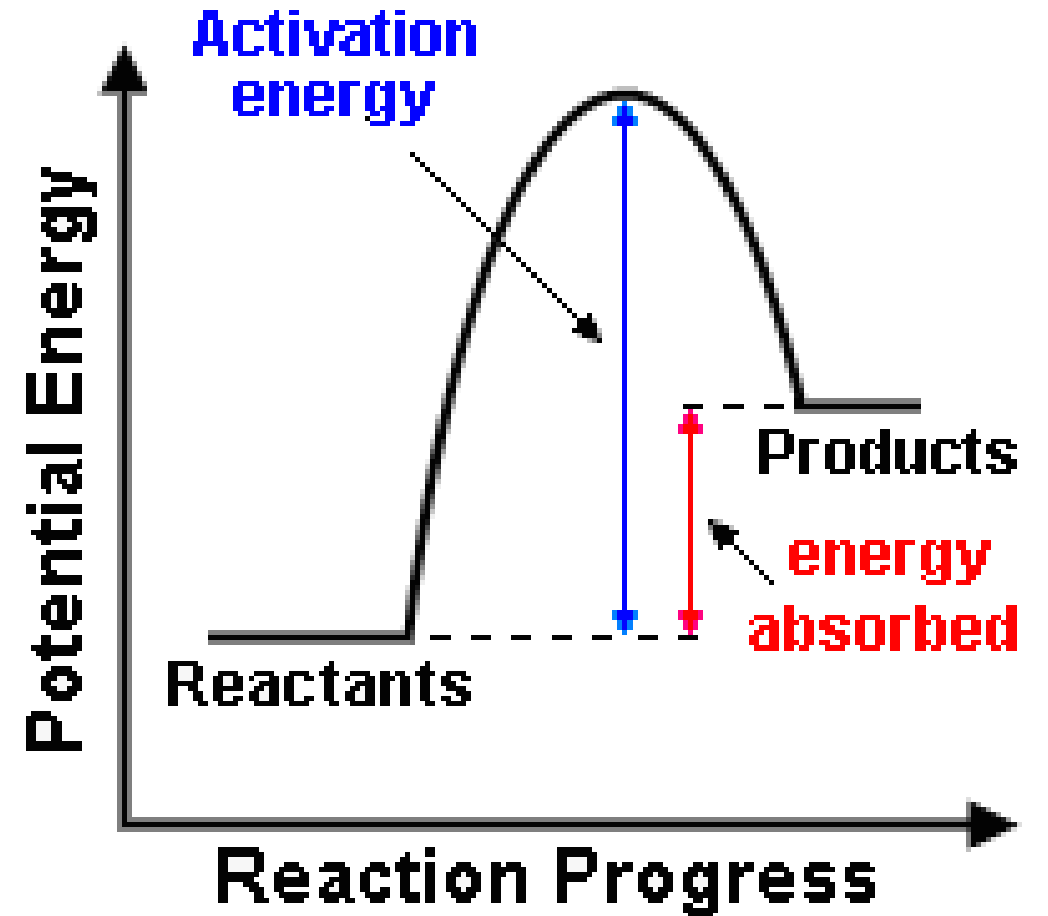
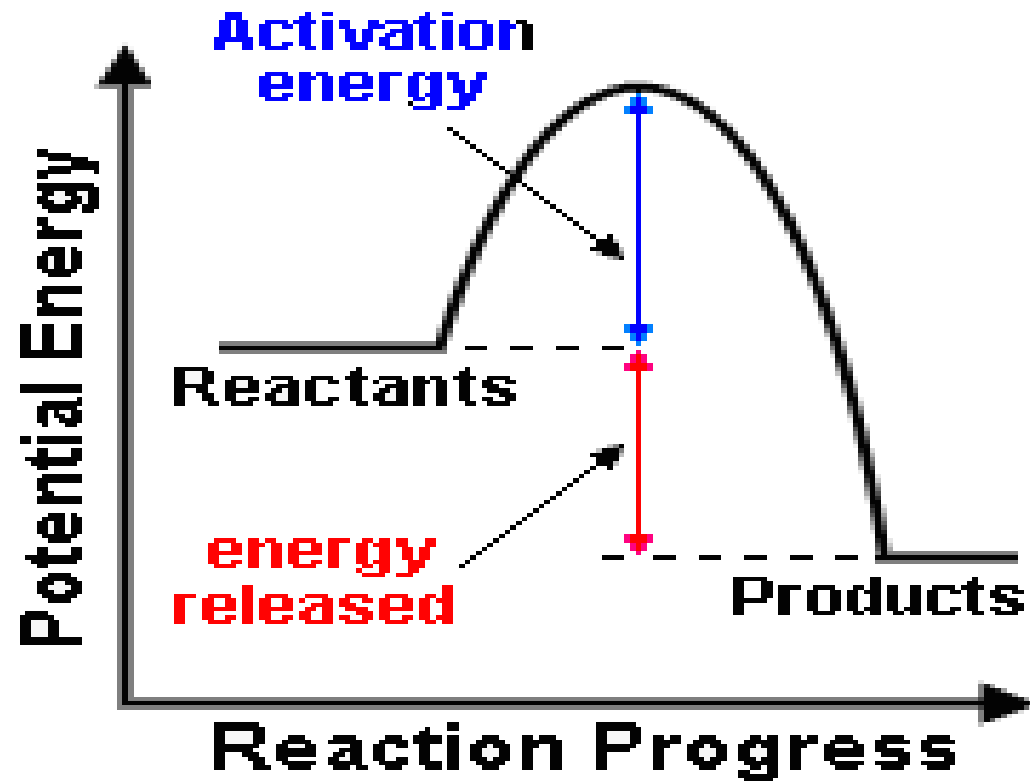


Free Energy Diagrams

- **Energy diagrams are visual representations of the change in energy in a reaction**
- **Activation Energy:** The maximum amount of energy needed for the reaction to occur
- **Enthalpy (ΔH):** Amount of energy released/absorbed



Which energy diagram shows exothermic? Endothermic?



Practice Problem #1

Is the reaction exothermic or endothermic?

What is the enthalpy change of the the reaction?

What is the activation energy of the reaction?

