

Concept Map: Thermochemical Changes (Chemistry 30)

Central concept: **Thermochemical Changes**

Connections

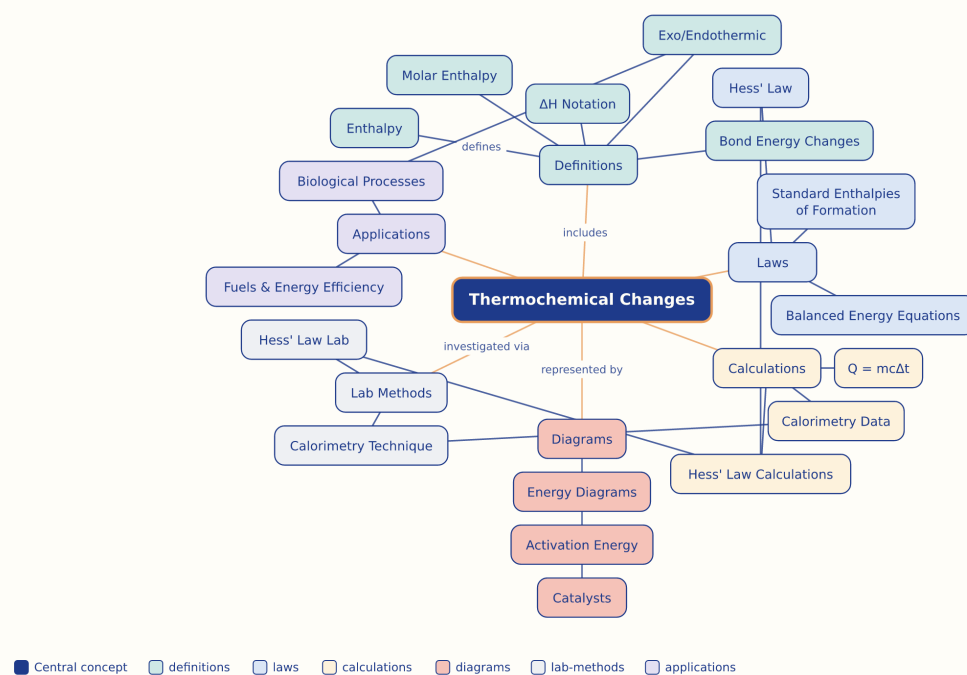
- Thermochemical Changes (includes) -> Definitions
- Thermochemical Changes (governed by) -> Laws
- Thermochemical Changes (quantified by) -> Calculations
- Thermochemical Changes (represented by) -> Diagrams
- Thermochemical Changes (investigated via) -> Lab Methods
- Thermochemical Changes (applied to) -> Applications
- Definitions (defines) -> Enthalpy
- Definitions (defines) -> Molar Enthalpy
- Definitions (uses) -> ΔH , ΔH_f° , ΔH_{rxn}°
- Definitions (classifies as) -> Exo/Endothermic
- Definitions (explained by) -> Bond Energy Changes
- Laws (states) -> Hess' Law
- Laws (uses) -> Standard Enthalpies of Formation
- Laws (expressed in) -> Balanced Energy Equations
- Calculations (applies) -> $Q = mc\Delta T$
- Calculations (analyzes) -> Calorimetry Data
- Calculations (performs) -> Hess' Law Calculations
- Hess' Law Calculations (applies) -> Hess' Law
- Diagrams (drawn as) -> Energy Diagrams
- Energy Diagrams (labels) -> Activation Energy
- Activation Energy (lowered by) -> Catalysts
- Lab Methods (measures) -> Calorimetry Technique
- Lab Methods (tests) -> Hess' Law Lab
- Calorimetry Technique (produces) -> Calorimetry Data
- Hess' Law Lab (informs) -> Hess' Law Calculations
- Applications (evaluates) -> Fuels & Energy Efficiency
- Applications (includes) -> Biological Processes
- Biological Processes (illustrates) -> Exo/Endothermic

Notes

- **Thermochemical Changes:** Study of energy changes in chemical reactions and their impacts on society ([Topic](#)) [Topic](#)
- **Definitions:** Core vocabulary for describing energy changes in reactions ([Outcome](#)) [Outcome](#)
- **Enthalpy:** Heat content of a system defined for chemical reactions ([Outcome](#)) [Outcome](#)
- **Molar Enthalpy:** Enthalpy change per mole of substance reacting ([Outcome](#), [Topic](#)) [Outcome](#), [Topic](#)

- **9D, $\Delta H^\circ_{\text{rxn}}$** : Symbol used to communicate and calculate energy changes ([Outcome](#)) [Outcome](#)
- **Exo/Endothermic**: Classification of reactions by direction of energy flow, e.g. photosynthesis, combustion ([Outcome](#)) [Outcome](#)
- **Bond Energy Changes**: Energy changes explained by bonds breaking/forming and potential/kinetic energy shifts ([Outcome](#)) [Outcome](#)
- **Laws**: Governing principles used to calculate reaction enthalpies ([Outcome](#), [Outcome](#)) [Outcome](#), [Outcome](#)
- **Hess' Law**: Net reaction enthalpy calculated from a series of reactions ([Outcome](#)) [Outcome](#)
- **Standard Enthalpies of Formation**: Used to predict enthalpy change for chemical equations ([Outcome](#)) [Outcome](#)
- **Balanced Energy Equations**: Equations written to include energy changes ([Outcome](#)) [Outcome](#)
- **Calculations**: Quantitative methods for determining energy changes ([Outcome](#), [Outcome](#)) [Outcome](#), [Outcome](#)
- **$Q = mc\Delta T$** : Formula recalled and applied to analyze heat transfer ([Outcome](#)) [Outcome](#)
- **Calorimetry Data**: Used to determine enthalpy changes in chemical reactions ([Outcome](#)) [Outcome](#)
- **Hess' Law Calculations**: Combining reaction steps to calculate molar enthalpy of combustion for magnesium ([Resource](#), [Outcome](#)) [Resource](#), [Outcome](#)
- **Diagrams**: Visual representations of energy changes during reactions ([Outcome](#)) [Outcome](#)
- **Energy Diagrams**: Diagram: potential energy vs reaction progress, showing reactant and product levels, activation energy peak, and enthalpy change arrow ([Outcome](#)) [Outcome](#)
- **Activation Energy**: Energy barrier labelled on energy diagrams ([Topic](#), [Outcome](#)) [Topic](#), [Outcome](#)
- **Catalysts**: Substances that lower activation energy, a key concept in the unit ([Topic](#)) [Topic](#)
- **Lab Methods**: Experimental approaches for measuring and applying enthalpy relationships ([Resource](#), [Resource](#)) [Resource](#), [Resource](#)
- **Calorimetry Technique**: Inquiry-based measurement of heat transfer in reactions ([Resource](#)) [Resource](#)
- **Hess' Law Lab**: Guided procedure combining reactions to find molar enthalpy of magnesium combustion ([Resource](#)) [Resource](#)
- **Applications**: Real-world relevance of thermochemical study to society and environment ([Topic](#)) [Topic](#)
- **Fuels & Energy Efficiency**: Evaluation of fuels and sustainable energy use ([Topic](#), [Resource](#)) [Topic](#), [Resource](#)
- **Biological Processes**: Photosynthesis and cellular respiration classified as endo/exothermic ([Outcome](#)) [Outcome](#)

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