

# Enthalpy Changes



The key areas of study in this topic are:

- Enthalpy changes ( $\Delta H$  of reaction, formation, combustion and neutralisation)
- Bond enthalpies
- Hess' Law and enthalpy cycles

By the end of this topic I should be able to:

	Start	End
Explain that some chemical reactions are accompanied by enthalpy changes that are exothermic ( $\Delta H$ , negative) or endothermic ( $\Delta H$ , positive)		
Construct enthalpy profile diagrams to show the difference in the enthalpy of reactants compared with products		
Explain the term activation energy, including use of enthalpy profile diagrams, as the minimum energy required for a reaction to take place.		
Define and use the following terms: <ul style="list-style-type: none"> <li>• standard conditions and standard states</li> <li>• enthalpy change of formation, <math>\Delta_f H</math></li> <li>• enthalpy change of combustion, <math>\Delta_c H</math></li> <li>• enthalpy change of neutralisation, <math>\Delta_{\text{neut}} H</math></li> </ul> Explain and use the following term: <ul style="list-style-type: none"> <li>• enthalpy change of reaction, <math>\Delta_r H</math></li> </ul>		
Determine enthalpy changes directly from appropriate experimental results, including use of the relationship: $q = mc\Delta T$		
Explain the term average bond enthalpy (breaking of 1 mol of bonds in gaseous molecules) Explain exothermic and endothermic reactions in terms of enthalpy changes associated with the breaking and making of chemical bonds Use average bond enthalpies to calculate enthalpy changes and related quantities Understand that an actual bond enthalpy may differ from the average value		
Use Hess' law to construct enthalpy cycles and calculations to determine indirectly: <ul style="list-style-type: none"> <li>• an enthalpy change of reaction from enthalpy changes of combustion</li> <li>• an enthalpy change of reaction from enthalpy changes of formation</li> <li>• enthalpy changes from unfamiliar enthalpy cycles</li> </ul>		
Understand the techniques and procedures used to determine enthalpy changes directly and indirectly (including A-level $\Delta_{\text{sol}} H$ and $\Delta_{\text{hyd}} H$ )		

**In all topic areas you should be able to demonstrate and apply your knowledge and understanding.**