

Meden School Curriculum Planning							
Subject	Chemistry	Year Group	12	Sequence No.		Topic	3.1.4 Energetics

Retrieval	Core Knowledge	Student Thinking
What do teachers need to retrieve from students before they start teaching new content ?	What specific ambitious knowledge do teachers need to teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to development of our students thinking, encouraging them to see the inequalities around them and 'do something about them!'
GCSE C5 Energy Changes in Reactions.	<p>3.1.4.1 Enthalpy Change Reactions can be endothermic or exothermic. Enthalpy change (ΔH) is the heat energy change measured under conditions of constant pressure. Standard enthalpy changes refer to standard conditions ie 100 kPa and a stated temperature (eg ΔH^\ominus_{298}). Students should be able to:</p> <ul style="list-style-type: none"> define standard enthalpy of combustion ($\Delta_c H^\ominus$) = enthalpy change when one mole of a substance in its standard states burns completely in oxygen define standard enthalpy of formation ($\Delta_f H^\ominus$). = enthalpy change when one mole of a compound is formed from its elements in their standard states <p>3.1.4.2 Calorimetry The heat change, q, in a reaction is given by the equation $q = mc\Delta T$ where m is the mass of the substance that has a temperature change ΔT and a specific heat capacity c. Students should be able to:</p> <ul style="list-style-type: none"> use this equation to calculate the molar enthalpy change for a reaction use this equation in related calculations. <p>Students will not be expected to recall the value of the specific heat capacity, c, of a substance.</p>	<p>It is important to know this value for chemical reactions that are used as a source of heat energy in applications such as domestic boilers and internal combustion engines.</p> <p>Handwarmers, coldpacks, self-heating cans are all everyday applications of enthalpy.</p> <p>All calorific values on food packs will have been collected</p>

	<p>Required practical 2 Measurement of an enthalpy change. Students could be asked to find ΔH for a reaction by calorimetry. Examples of reactions could include:</p> <ul style="list-style-type: none"> • dissolution of potassium chloride • dissolution of sodium carbonate • neutralising NaOH with HCl • displacement reaction between $\text{CuSO}_4 + \text{Zn}$ • combustion of alcohols. <p>3.1.4.3 Applications of Hess's Law Hess's law. Students should be able to use Hess's law to perform calculations, including calculation of enthalpy changes for reactions from enthalpies of combustion or from enthalpies of formation. Students could be asked to find ΔH for a reaction using Hess's law and calorimetry, then present data in appropriate ways. Examples of reactions could include:</p> <ul style="list-style-type: none"> • thermal decomposition of NaHCO_3 • hydration of MgSO_4 • hydration of CuSO_4 <p>3.1.4.4 Bond Enthalpies Mean bond enthalpy = bond enthalpies are mean values across a range of compounds containing that bond Students should be able to:</p> <ul style="list-style-type: none"> • define the term mean bond enthalpy • use mean bond enthalpies to calculate an approximate value of ΔH for reactions in the gaseous phase • explain why values from mean bond enthalpy calculations differ from those determined using Hess's law. 	<p>experimentally using calorimetry.</p>
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