Subject	Year	Term
Chemistry	13	4

Topic

5.2.1 Lattice Enthalpy & 5.2.2 Enthalpy and Entropy

Content (Intent)

Prior Learning (Topic) GCSE: C5. Year 12: 1.1, 1.2, 2.1, 3.1.1 Periodicity and 3.2.1 Enthalpy changes

Lattice enthalpy

- Define lattice enthalpy (formation of 1 mol of ionic lattice from gaseous ions, ΔLEH) and understand how it can be used as a measure of the strength of ionic bonding in a giant ionic lattice **(see also 2.2.2 b–c)**

Born–Haber and related enthalpy cycles

- Be able to construct Born–Haber cycles and carry out related calculations
- Define and use the terms: enthalpy change of solution (dissolving of 1 mol of solute, $\Delta_{sol}H$), enthalpy change of hydration (dissolving of 1 mol of gaseous ions in water, $\Delta_{hyd}H$)
- Be able to give a qualitative explanation of the effect of ionic charge and ionic radius on the exothermic value of a lattice enthalpy and enthalpy change of hydration.

Entropy

- Know that entropy is a measure of the dispersal of energy in a system which is greater, the more disordered a system
- Be able to explain the difference in magnitude of the entropy of a system involving solids, liquids and gases or a different number of gaseous molecules
- Calculate the entropy change of a system, ΔS, and related quantities for a reaction given the entropies of the reactants and products

Free energy

- Be able to explain that the feasibility of a process depends upon the entropy change and temperature in the system, TΔS, and the enthalpy change of the system, ΔH
- Be able to explain and carry out related calculations, of the free energy change, ΔG, as: ΔG = ΔH – TΔS (the Gibbs' equation) and that a process is feasible when ΔG has a negative value
- Describe some of the limitations of predictions made by ΔG about feasibility, in terms of kinetics.

Future Learning (Topic) End topic – Revision after this

How will knowledge and skills be taught? (Implementation)	How will your understanding be assessed & recorded (Impact)
1. Lattice enthalpy 2. Born Haber cycles (type 1) 3. Born Haber cycles (type 2) 4. Ionic charge and radius 5. Entropy and ΔS 6. Gibbs free energy **Practical work**	- 2 x standard homework (Grade given. Written feedback. Response expected.) -1 x paper 1 (Grade given. Verbal feedback to class and individuals.)

Determining the enthalpy change of solution indirectly. Relationship between enthalpy, entropy and feasibility **Written** Presentations Worked through calculations and explanations Past paper question examples and answers Construction of Born-Haber cycles Modelled answers with key points/terms	

How can parents help at home?

Look at the topic specific resources on the VLE
Use appropriate websites: MachemGuy, Allery Chemistry, Chemistry World – by Royal Society of Chemistry, ChemGuide.
Take an interest! Ask your children what they have learnt and be curious about their learning.

Helpful further reading/discussion

Reading	**Vocabulary Lists**	**Careers Links**
Text book: A level chemistry for OCR by Rob Ritchie and Dave Gent. Chapter 22 p.346-371 The Science of Everyday Life by Marty Jopson Why Chemical Reactions Happen by Keeler and Wothers	lattice enthalpy enthalpy of solution enthalpy of atomisation ionisation energy hydration enthalpy electron affinity ionic radius ionic charge exothermic endothermic entropy disorder	Medicine Veterinary science Material science Biomedical sciences Environmental science Toxicologist Pharmacist Dentist