West Kirby Grammar School

Curriculum Map – Year 11 – Chemistry

Topic Name	Term	Skills Developed	Link to NC Subject Content	Next link in curriculum	Other Notes
4.6 The rate and extent of Chemical change	*Autumn*	WS 2.6 Make and record observations and measurements using a range of apparatus and methods. MS 1a Recognise and use expressions in decimal form. MS 4aTranslate information between graphical and numeric form. MS 4b Drawing and interpreting appropriate graphs from data to determine rate of reaction. MS 4c Plot two variables from experimental or other data MS 4d Determine the slope and intercept of a linear graph. MS 4e Draw and use the slope of a tangent to a curve as a measure of rate of change. WS 1.2 - Use a variety of models such as representational, spatial, descriptive, computational and	• factors that influence the rate of reaction: varying temperature or concentration, • changing the surface area of a solid reactant or by adding a catalyst **Reversible Reactions** • Recognise that some reactions are reversible • Explain how the direction of reversible reactions can be changed by changing conditions • Know that if a reaction is exothermic in one direction, it is endothermic in the opposite direction and that the same amount of energy it transferred in each case. **Dynamic Equilibrium (4.6)** • Recognise that when a reversible reaction occurs in apparatus which prevents the escape of reactants and products, equilibrium is reached when the forward and reverse reactions occur at	***Links from prior topics:*** **GCSE** 4.3 Quantitative Chemistry • Concentrations • Moles ***Links to future topics:*** **GCSE** **4.5 Energy Changes** A Level Links to A'level unit 1 Kinetics Year 12 • Reaction rates • Measuring reaction rates Equilibrium, Le Chatelier's Principle and K_c – AS Chemistry Equilibrium Constant K_p for Homogenous Systems – A2 Chemistry	

		mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. WS 3.5 - Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. WS 3.8 - Communicating the scientific rationale for investigations, methods used, findings and reasoned conclusions through paper-based and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms.	exactly the same rate. • Make qualitative predictions about the effect of changes on systems at equilibrium when given appropriate information. • Interpret appropriate given data to predict the effect of a change in concentration of a reactant or product or temperature and pressure changes on given reactions at equilibrium.		

4.5 Energy Changes	*Spring*	• AT 5 - An opportunity to measure temperature changes when substances react or dissolve in water. • AT6 - Safe and careful use of liquids. • MS1a - Recognise and use expressions in decimal form	• Distinguish between exothermic and endothermic reactions on the basis of the temperature change of the surroundings • Evaluate uses and applications of exothermic and endothermic reactions given appropriate information. • Draw simple reaction profiles (energy level diagrams) for exothermic and endothermic reactions showing the relative energies of reactants and products, the activation energy and the overall energy change, with a curved line to show the energy as the reaction proceeds • Use reaction profiles to identify reactions as exothermic or endothermic • Explain that the activation energy is the energy needed for a reaction to occur.	***Links from prior topics:*** **KS3** Y8 Chemical Reactions • Endothermic & Exothermic reactions **GCSE** ***Links to future topics:*** A Level Energetics - AS Chemistry Kinetics – AS Chemistry Electrode Potentials & Electrochemistry – A Level Chemistry Thermodynamics – A Level Chemistry	**Required practical 4:** Investigate the variables that affect temperature changes in reacting solutions such as, eg acid plus metals, acid plus carbonates, neutralisations, displacement of metals. AT skills covered by this practical activity: 1, 3, 5 and 6.

			• Energy must be supplied to break bonds in the reactants • Energy is released when bonds in the products are formed.		
4.10 Using resources	*Summer*	WS 1.4 Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. WS 1.6	Life cycle assessment and recycling to assess environmental impacts Associated with all the stages of a product's life The viability of recycling of certain materials for limited resources Extraction and purification of metals related to the position of carbon in a reactivity series.	Group 2 and group 7 Year 12 • Water treatment	

		Recognise the importance of peer review of results and of communicating results to a range of audiences. MS 1a - Recognise and use expressions in decimal form. MS 1c - Use ratios, fractions and percentages. AT 4 - Prepare an ammonium salt.	The Earth's water resources and obtaining potable water. **The Haber Process (4.10)** • Recall that the Haber process is used to manufacture ammonia, which can be used to produce nitrogen-based fertilisers. • Recall a source for the nitrogen and a source for the hydrogen used in the Haber process. • interpret graphs of reaction conditions versus rate • Apply the principles of dynamic equilibrium in Reversible reactions and dynamic equilibrium (page 59) to the Haber process • Explain the trade-off between rate of production and position of equilibrium • Explain how the commercially used conditions for the Haber process are related to the availability and cost of raw materials and energy supplies, control of equilibrium position and rate.		

			NPK Fertilisers • Recall the names of the salts produced when phosphate rock is treated with nitric acid, sulfuric acid and phosphoric acid • Compare the industrial production of fertilisers with laboratory preparations of the same compounds, given appropriate information.		