YEAR 13 - Teacher 2

'An ambitious curriculum that meets the needs of all'

Medium Term Planning - Topic: Physical and Inorganic Chemistry

Curriculum Intent

In addition to working further on objectives from Y12, pupils will be taught, following National Curriculum guidelines, the following this term:

Skills/Assessment Objective Links

Unit Title	Spec	Knowledge	Skills developed from learning knowledge
Rate equations	3.1.9	Using rate equations and k. Orders of reactions. Arrhenius equation.	Calculating k, and the rate in equations. Identifying orders of reaction from data. Drawing a graph to utilise the Arrhenius equation.
Kp	3.1.10	Deducing Kp. Calculation of Kp from partial pressures	Calculating mole fractions, partial pressures in order to work out Kp.
Acids and bases	3.1.12	Definition of pH, Kw, Ka, pKa, indicators, buffer solutions	Defining pH in terms of H+ ions. Calculating pH for strong acids, weak acids and strong bases. Suggesting suitable indicators for reactions. Calculating pH of buffer solutions.
Thermodynamics	3.1.8	Born-Haber cycles, entropy, gibbs free-energy	Constructing a Born-Haber cycle and using this to calculate the formation of an ionic compound. Explaining difference in experimental and theoretical values with covalent character. Describing a change in terms of it's entropy. Using enthlapy and entropy together in a gibbs free-energy calculation to ascertain if a reaction is feasible.
Electrode potentials	3.1.11	Redox, representing cells, reference electrodes, calculating EMF of a cell, commercial applications	Drawing the conventional cell representations for half cells and combining these to make full cells. Explaining the need for a reference electrode. Using E data to calculate the voltage of a cell. Explaining commercial cells and batteries.
Transition metals + ions in solutions	3.2.5	Complexes, ligands, substitution reactions, shapes, coloured ions, variable oxidation states, catalysis, amphoteric character, test tube reactions	Drawing transition metal complexes. Explaining stereochemistry in TM complexes from utilising different ligands. Explaining how colour arises from splitting of energy in d-orbitals. Recalling substitution reactions and colours of the ions formed.
P3 element and oxides	3.2.4	Bonding. Trends, reactions of elements and oxides with water	Identifying the type of bonding across P3. Recalling the reactions of P3 elements and their oxides with water.

Spiritual, moral, social, and cultural development	**SMSC:** **PSHE/British Values: Links to research in UK** **Skills Builder: Links to practical applications at University and research**
Numeracy	**Interpreting spectra**
Literacy	**Vocabulary Tier 2: Highlighted above** **Vocabulary Tier 3: Highlighted above** **Reading: Exam questions, Textbooks** **Writing: Correct usage of key terms in exam responses** **Oracy: Use of subject specific language**
Becoming future ready	**Careers/Employability:** Chemist. Pharmacist. Medic. Vet. Biological science. Sports sciences.
Adaptation **QFT/SEND Provision**	Throughout this topic, quality first teaching will provide differentiation: **By product:** **By resource:** Doddle powerpoints, homework books, exam papers, textbooks **By Intervention**: by providing different levels of supervision and support **By Progressive Questioning:** exploring pupils' understanding through interactive dialogue. **By Grouping:** according to prior attainment, gender, social preference, preferred learning style. **By Task:** Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range. **By Offering Optional Activities:** In class or as homework, to extend learning. This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.

Implementation Curriculum Delivery

Learning Outcomes (Knowledge) **Core Knowledge**

Unit Title	Spec	Knowledge	Skills developed from learning knowledge
Rate equations	3.1.9	Using rate equations and k. **Orders of reactions**. Arrhenius equation.	Calculating k, and the rate in equations. Identifying orders of reaction from data. Drawing a graph to utilise the Arrhenius equation.
Kp	3.1.10	Deducing Kp. **Calculation of Kp** from partial pressures	Calculating mole fractions, partial pressures in order to work out Kp.
Acids and bases	3.1.12	Definition of pH, Kw, Ka, pKa, indicators, **buffer solutions**	Defining pH in terms of H+ ions. Calculating pH for strong acids, weak acids and strong bases. Suggesting suitable indicators for reactions. Calculating pH of buffer solutions.
Thermodynamics	3.1.8	**Born-Haber cycles**, **entropy**, gibbs free-energy	Constructing a Born-Haber cycle and using this to calculate the formation of an ionic compound. Explaining difference in experimental and theoretical values with covalent character. Describing a change in terms of it's entropy. Using enthlapy and entropy together in a gibbs free-energy calculation to ascertain if a reaction is feasible.
Electrode potentials	3.1.11	Redox, representing cells, reference electrodes, **calculating EMF of a cell,** commercial applications	Drawing the conventional cell representations for half cells and combining these to make full cells. Explaining the need for a reference electrode. Using E data to calculate the voltage of a cell. Explaining commercial cells and batteries.

	Transition metals + ions in solutions	3.2.5	Complexes**, ligands**, substitution reactions, **shapes**, coloured ions, variable oxidation states, catalysis, amphoteric character, test tube reactions	Drawing transition metal complexes. Explaining stereochemistry in TM complexes from utilising different ligands. Explaining how colour arises from splitting of energy in d-orbitals. Recalling substitution reactions and colours of the ions formed.
	P3 element and oxides	3.2.4	Bonding. **Trends,** reactions of elements and oxides with water	Identifying the type of bonding across P3. Recalling the reactions of P3 elements and their oxides with water.
Current learning to be developed in the future within:	Chemical/biochemical/physical sciences at degree level			
Assessment	Regular assessment using past exam questions. Classwork and homework based on exam papers and self marking so pupils become familiar with how work is assessed.			
Impact	Pupils will be confident and competent at answering a wide range of exam questions that explore their vast knowledge and apply it to unfamiliar situations and practical applications.			