

Chemistry at Norbury High

Overview

Chemistry at A level is an information-rich course designed to develop theoretical and practical scientific skills, knowledge and understanding. It offers exciting insights into the contemporary world of science.

Chemistry is a multidisciplinary subject that is made up of many different and interdependent fields.

Students study chemistry in a range of different contexts, including aspects of industrial and everyday life, which requires them to investigate and solve problems. There is 20% of mathematics in A level Chemistry.

KS5 A Level Chemistry

Students will sit two AS examinations at the end of year 12 (AQA 7404) and three A2 examinations at the end of year 13 (AQA 7405).

Year 12

During Year 12 the students will cover four main areas:

Section 1: Physical Chemistry 1

- o Atomic Structure
- o Amount of substances
- o Bonding
- o Energetics
- o Kinetics
- o Equilibria
- o Oxidation, reduction and redox reactions.

Section 2: Inorganic Chemistry 1

- o Periodicity
- o Group 2, the Alkaline Earth metals
- o Group 7, (17) the Halogens

Section 3: Organic chemistry 1

- o Introduction to organic chemistry

- o Alkanes
- o Halogenoalkanes
- o Alcohols
- o Organic Analysis

Year 13

Section 1: Physical Chemistry 2

- o Thermodynamics
- o Kinetics
- o Equilibrium Constants K_p
- o Electrode potentials & Electrochemical cells
- o Acids, bases & buffers

Section 2: Inorganic Chemistry 2

- o Periodicity
- o The Transition metals
- o Reactions of inorganic compounds in aqueous solutions.

Section 3: Organic Chemistry 2

- o Nomenclature and Isomerism
- o Compounds containing the carbonyl group
- o Aromatic Chemistry
- o Amines
- o Polymerisation
- o Amino acids, proteins and DNA
- o Organic synthesis and Analysis
- o Structure determination
- o Chromatography

Below is a list of the 12 required practical and the corresponding apparatus and techniques.

Chemistry required activities (1-6 AS), (1-12 A-level)

Required activity	Apparatus and technique reference
1. Make up a volumetric solution and carry out a simple acid–base titration	a, d, e, f, k
2. Measurement of an enthalpy change	a, d, k
3. Investigation of how the rate of a reaction changes with temperature	a, b, k
4. Carry out simple test-tube reactions to identify: <ul style="list-style-type: none"> • cations – Group 2, NH₄⁺ • anions – Group 7 (halide ions), OH[–], CO₃^{2–}, SO₄^{2–} 	d, k
5. Distillation of a product from a reaction	b, d, k
6. Tests for alcohol, aldehyde, alkene and carboxylic acid	b, d, k
7. Measuring the rate of reaction: <ul style="list-style-type: none"> • by an initial rate method • by a continuous monitoring method 	a, k, l a, k, l
8. Measuring the EMF of an electrochemical cell	j, k
9. Investigate how pH changes when a weak acid reacts with a strong base and when a strong acid reacts with a weak base	a, c, d, k
10. Preparation of: <ul style="list-style-type: none"> • a pure organic solid and test of its purity • a pure organic liquid 	a, b, d, g, h, k b, d, g, k
11. Carry out simple test-tube reactions to identify transition metal ions in aqueous solution	b, d, k
12. Separation of species by thin-layer chromatography	i, k

Chemistry apparatus and techniques Apparatus and techniques

AT a	Use appropriate apparatus to record a range of measurements (to include mass, time, volume of liquids and gases, temperature)
AT b	Use water bath or electric heater or sand bath for heating
AT c	Measure pH using pH charts, or pH meter, or pH probe on a data logger
AT d	Use laboratory apparatus for a variety of experimental techniques including:
	<ul style="list-style-type: none"> • titration, using burette and pipette
	<ul style="list-style-type: none"> • distillation and heating under reflux, including setting up glassware using retort stand and clamps
	<ul style="list-style-type: none"> • qualitative tests for ions and organic functional groups • filtration, including use of fluted filter paper, or filtration under reduced pressure
AT e	Use volumetric flask, including accurate technique for making up a standard solution
AT f	Use acid–base indicators in titrations of weak/strong acids with weak/strong alkalis
AT g	Purify: • a solid product by recrystallisation
	<ul style="list-style-type: none"> • a liquid product, including use of separating funnel
	a liquid product, including use of separating funnel
AT h	Use melting point apparatus
AT i	Use thin-layer or paper chromatography
AT j	Set up electrochemical cells and measuring voltages
AT k	Safely and carefully handle solids and liquids, including corrosive, irritant, flammable and toxic substances
AT l	Measure rates of reaction by at least two different methods, for example:
	<ul style="list-style-type: none"> • an initial rate method such as a clock reaction
	<ul style="list-style-type: none"> • a continuous monitoring method