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**A-Level Chemistry A level Guide**

**How Chemistry will be taught:**

Chemistry at Key Stage 5 builds on the broad knowledge and skills developed at Key Stage 4, with the assumption that students become good independent learners and are inquisitive in their learning. Students will further develop an extensive range of practical skills relevant to further study and working practice.

The A Level curriculum will focus on the three major branches of Chemistry: physical, organic and inorganic. The course will be taught by multiple teachers, all of which are graduates with chemistry degrees and are experts within certain fields of the A Level syllabus.

**Working expectations:**

The jump in challenge from GCSE to A level is one of the greatest single jumps in education you will experience within the chemistry field. To enable you to succeed within Chemistry you therefore must be supplementing your class work (6 periods a week) with minimum 4 hours of self-study on top of homework to achieve the highest grades. It is highly recommended you read around and above what you are learning in lessons to give you a broader and better understanding of how fundamental chemistry is in today’s world. Teachers are very happy to help you with where to access material for this. During lessons you will be taught the key concepts and fundamental understandings for each subject; we will then through self, peer and group work develop that understanding to application and novel situations.

**What 100% effort in this subject looks like:**

* Daily Self-study outside of class.
* Do not give up when asked to apply your understanding; you have the tools you just need to learn to use them.
* Use the Kerboodle checklists to ensure thorough notes.
* When struggling, learn how to self-diagnose issues and use a range of resources and tools to move your own learning forward.
* Seek teacher help proactively.
* Use websites with past paper questions, such as Maths and Physics tutor to supplement your notes and practise exam questions.
* Wider reading in the subject, such as reading Chemistry review.

**Folder Policy:**

*Your folder should have:*

* Organised into chapters and units shown in the KS5 guide, This will be explained to you by one of your teachers. You will need to bring a Leaver arch folder to your first week’s lessons. You will be expected to self-maintain your folder after this point.
* Glossary printed off.
* All marked work should be at the front of each chapter they relate to as when revising it is better to focus on the areas which you are not as sure of.
* All end of topic tests and unit tests which are marked will be kept at a school folder and will be given at the end of the year before the exam period.

**Laboratory Book Policy:**

At the end of Year 2 you will either pass or fail your Common Practical Assessment Criteria (CPAC) which is based on the practical work you complete in Biology.

*Your lab book should have minimum:*

* Number EVERY page
* PROUD science expectations (inside cover)
* Lab book expectations (page 1)
* Health and safety agreement – safety rules (page 2)
* Contents page (pages 3-4)

*From access to the school shared drive in the back of the lab book:*

* References
* Tables and Graphs
* AQA Glossary of terms
* Chemistry apparatus techniques and required practical (Chemistry AT and RP)
* NUAST common practical assessment criteria (CPAC) evidence

It is the student’s responsibility; however teachers will support these by sharing which CPAC criteria will be examined and feeding back. These are built upon throughout the 2 years.

**What Marking looks like:**

* Ordinary class notes are not marked; they are for you only.
* Some homeworks that are gathering of information will be checked visually but not graded or specifically marked.
* Homeworks that involve your thinking and analysis will be marked with scores/grades.
* Lab books will be assessed on the CPAC criteria as either red (missed a section) /amber (working towards) or green (met the criteria).
* End of topic tests and unit tests will be marked and a directed improvement reflective task (DIRT) associated to help improve knowledge/understanding.

**What Homework looks like:**

* Exam questions
* Research tasks
* Flipped learning tasks
* Reviewing of topics

**Specification at a glance:**

Chemistry is split into three disciplines; Physical chemistry, Inorganic chemistry and Organic chemistry. You will access each of these disciplines in each year of the A level course either widening or deepening your understanding of each in the second year.

**Physical chemistry:**

Physical chemistry is the study of macroscopic and microscopic phenomena in the chemical systems includes areas such as motion, energy, force, time, thermodynamics, quantum chemistry, analytical dynamics and chemical equilibrium. It is highly mathematically based and requires a minimum of Higher GCSE mathematical skills to fully access it.

It is broken down into these topics

* Atomic structure
* Amount of substance
* Bonding
* Energetics
* Kinetics
* Chemical equilibria, Le Chatelier’s principle and Kc
* Oxidation, reduction and redox equations
* Thermodynamics (A-level only)
* Rate equations (A-level only)
* Equilibrium constant Kp for homogeneous systems (A-level only)
* Electrode potentials and electrochemical cells (A-level only)
* Acids and bases (A-level only)

**Inorganic chemistry:**

Inorganic chemistry looks at elements other than hydrocarbons or hydrocarbon based compounds. It focuses on patterns within the periodic table and properties of key grpups including the transition metals. This is the smallest section (and often seen as one of the easiest) in Alevel chemistry but is content critical, in terms of every part of the specification comes up.

It is broken down into these topics

* Periodicity
* Group 2, the alkaline earth metals
* Group 7(17), the halogens
* Properties of Period 3 elements and their oxides (A-level only)
* Transition metals (A-level only)
* Reactions of ions in aqueous solution (A-level only)

**Organic chemistry**

Organic chemistry is a branch of chemistry that studies the structure, properties and reactions of carbon based compounds or hydrocarbon derivatives. It is the largest of the disciplines of chemistry and content heavy. You will look into a lot more detail about how reactions occur and how the changes take place.

It is broken down into these topics

* Alkanes
* Halogenoalkanes
* Alkenes
* Alcohols
* Organic analysis
* Optical isomerism (A-level only)
* Aldehydes and ketones (A-level only)
* Carboxylic acids and derivatives (A-level only)
* Aromatic chemistry (A-level only)
* Amines (A-level only)
* Polymers (A-level only)
* Amino acids, proteins and DNA (A-level only)
* Organic synthesis (A-level only)
* Nuclear magnetic resonance spectroscopy (A-level only)
* Chromatography (A-level only)

**Summer preparation**

The purpose of giving you a summer bridging task is:

1. To provide a bridge from level 2 to level 3 study, and lead into the early stages of the course.
2. To engage you in independent learning which is required at level 3. iii. To encourage you to develop your work ethic and commitment to study. iv. To measure your suitability for the course and assess your initial levels of achievement.

**Task 1**:

One of the more difficult sections and the first you will encounter is the amount of substance topic (often referred to as quantitative chemistry at GCSE)

These use two key equations

* Moles (mol) = Mass(g) / Relative formula mass (g/mol)
* Concentration (mol/dm3) = Moles (mol) / Volume (dm3)

Task one focuses on the first equation

|  |  |  |
| --- | --- | --- |
| 1. Calculate the number of moles present in each of the following cases: | 2. Calculate the mass of substance present in the following cases: | 3. Calculate the relative molecular mass of the following substances and suggest a possible identity of each substance: |
| a) 2.3 g of Na | a) 0.05 moles of Cl2 | a) 0.015 moles, 0.42 g |
| b) 2.5 g of O2 | b) 0.125 moles of KBr | b) 0.0125 moles, 0.50 g |
| c) 240 kg of CO2  | c) 0.075 moles of Ca(OH)2 | c) 0.55 moles, 88 g |
| d) 12.5 g of Al(OH)3 | d) 250 moles of Fe2O3 | d) 2.25 moles, 63 g |
| e) 5.2 g of PbO2 | e) 0.02 moles of Al2(SO4)3 | e) 0.00125 moles, 0.312 g |

4. Calculate the mass of H2O required to react completely with 5.0 g of SiCl4:

 SiCl4 + 2H2O 🡪 SiO2 + 4HCl

5. Calculate the mass of phosphorus required to make 200 g of phosphine, PH3, by the reaction:

P4(s) + 3NaOH(aq) +3H2O(l) 🡪 3NaH2PO2(aq) + PH3(g)

**Task 2:**

Focuses on the second equation

1. Calculate the number of moles of H2SO4 in 50 cm3 of a 0.50 moldm-3 solution.
2. Calculate the number of moles of FeSO4 in 25 cm3 of a 0.2 moldm-3 solution.
3. Calculate the mass of KMnO4 in 25 cm3 of a 0.02 moldm-3 solution.
4. Calculate the mass of Pb(NO3)2 in 30 cm3 of a 0.1 moldm-3 solution.

**Please bring your work with you to your first lesson.**

**Potentially useful websites:**

<https://www.senecalearning.com/>

<https://www.physicsandmathstutor.com/biology-revision/a-level-aqa/>

**Link to the AQA Chemistry Specification:**

<https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-7404-7405-SP-2015.PDF>