

Introduction

Welcome to your Chemistry GCSE course!

Important note before you start!

It is not easy to do well in this exam unless you are part of a classroom situation. This is because of the coursework and practical requirements. If you are studying at home, it is vital that you discuss this problem with your tutor before starting to study. See below for further details.

This course is intended for students taking the Assessment and Qualifications Alliance (AQA) Chemistry Syllabus 3421.

Textbook

Besides the course, you will also need to acquire the following supporting textbook:

Eileen Ramsden: *Key Science Chemistry*
(3rd edition; published by Stanley Thornes; ISBN 0-7487-6242-6)

One easy way of purchasing the textbook is through Oxford Open Learning's website (www.ool.co.uk). Make sure you consult the latest edition, otherwise reading references throughout the course might be inaccurate.



Oxford Open Learning

Arrangement of Lessons

References given below are to Eileen Ramsden's *Key Science Chemistry*:

Module One	The Nature of Substances	
Lesson		Reading
1.	Classifying Substances	Topics 1 & 3
2.	Chemistry; Chemical Apparatus	Introduction
3.	Particles and Atomic Structure	Topics 2 & 6
3/A	Molecules, Bonds and Formulae	Topics 5 & 8
4.	<i>Test A</i>	
4.	Structure and the Periodic Table	Topics 11 & 4
Module Two	How Chemicals React	
5.	Chemical Reactions	Topics 4 & 27
6.	Moles and Reacting Quantities	Topic 26
6/B	<i>Test B</i>	
7.	Acids and Bases	Topics 9 & 10
8.	Reaction Rates	Topic 25
9.	Energy Changes in Chemical Reactions	Topic 27
9/C	<i>Test C</i>	
10.	Electrochemistry	Topic 7
Module Three	Air and Water	
11.	The Atmosphere	Topics 13 & 14
12.	Nitrogen and its Compounds	Topic 22
12/D	<i>Test D</i>	
13.	Hardness of Water	Topic 15
	Coursework	

Module Four	Chemicals from the Earth	
14. 15. 15/E	Rocks and Minerals Sulphur and its Compounds <i>Test E</i>	Topics 18 & 19 Topics 16 & 22
16. 17.	The Halogens and their Compounds Limestone, Chalk and Marble Lithium, Sodium and Potassium	Topic 10 Topic 21
18. 18/F	Reactivity and Extraction of Metals <i>Test F</i>	(Topic 4)
19.	Group 1 and Group 2 Metals and their Compounds	Topic 19
20.	Transition Metals and their Compounds	(Topic 19)
Module Five	Organic Chemistry	
21. 22. 22/G	Carbon and Organic Chemistry Alkanes and Alkenes <i>Test G</i>	Topic 13 Topic 23 & 28
23. 24. 25. 25/H 25/I	Crude Oil and Hydrocarbon Fuels Functional Groups More Complex Organic Compounds <i>Test H</i> <i>Final Examination Paper</i>	Topic 16 Topic 29 (Topic 29)

N.B. There is no direct relationship in every case between lessons and book chapters. Topic 5 is first relevant in Lesson Three, for instance, but it is also relevant to a number of later lessons, so you may need to revise it then or refer back to specific sections. Topics that are relevant, but which the student should have already read, are shown in brackets.

The AQA Syllabus (3421)

This syllabus is one of a suite of GCSE Science Framework specifications (syllabuses) offered by AQA. Other Chemistry syllabuses in other years are also based on the GCSE Science Framework and this course is also suitable for those.

With AQA, there are two tiers of assessment: Foundation (grades G-C) and Higher (D-A*). Candidates enter for one tier only.

Written Paper

80% of total marks
Foundation Tier 2¼ hours.
Structured questions including extended writing.

Or

Higher Tier 2¼ hours.
Structured questions including extended writing.

You do not need to decide at the outset which tier you will be entering. Please ask for your tutor's advice at a later stage.

Coursework

20 % of total marks
Internal assessment of investigative skills associated with scientific enquiry.

This specification is available for private candidates. Private candidates should write to AQA for a copy of Supplementary Guidance for Private Candidates.

Course Aims

The syllabus and this course encourage candidates to:

1. acquire a systematic body of scientific knowledge, and the skills needed to apply this in new and changing situations in a range of domestic, industrial and environmental contexts;
2. acquire an understanding of scientific ideas, how they develop, the factors which may affect their development and their power and limitations;
3. plan and carry out a range of investigations, considering and evaluating critically their own data and that obtained from other sources, and using ICT where appropriate;

4. evaluate in terms of their scientific knowledge and understanding, the benefits and drawbacks of scientific and technological developments, including those related to the environment, personal health and quality of life, and considering ethical issues;
5. select, organise and present information clearly and logically, using appropriate scientific terms and conventions, and using ICT where appropriate..

Supplementary Reading

No harm will come from you broadening your interest in chemistry by doing supplementary reading, but in terms of obtaining a high GCSE grade, the recommended text book, together with this course, will provide you with all that is necessary for success.

Syllabus

You are very strongly advised to obtain a copy of the syllabus for the examination you intend to sit — AQA 3421. This may change a little from year to year. If you do this, you can ensure that you cover all of the work intended.

The syllabus can be purchased from Publications, AQA, Aldon House, 39, Heald Grove, Rusholme, Manchester M14 4NA (tel: 0161-953-1170) or downloaded from www.aqa.org.uk/qual/pdf/AQA3421WSP.pdf.

You are also strongly recommended to obtain some past papers or sample papers from AQA. This will give you a better idea of what you will face in the examination and the chance of some extra practice.

Practical Work

Practical work is an important part of any science course. This is not as easy for learners studying at home as it is for those in a classroom situation. But this course aims to develop your practical skills whether or not you have the opportunity to use laboratory equipment. There are many useful experiments which can be performed in an informal environment, e.g. at home.

This course is mainly designed for “external” candidates, i.e. adults or open learners. We assume that you may not be part of a full-time classroom situation (although it would help if you have some access to the facilities at a school or college). You might wish to discuss this with your tutor before you start.

Necessary Mathematical Skills

Some mathematical skills will be assumed, i.e.

- The four rules applied to whole numbers and decimals
- Use of tables and charts
- Interpretation and use of graphs
- Drawing graphs from given data
- Reading, interpreting and drawing simple inferences from tables
- Vulgar and decimal fractions and percentages
- Scales
- Elementary ideas and applications of common measures of rate
- Averages/means and the purposes for which they are used
- Substitution of numbers for words and letters in formulae (without transformation of simple formulae)

The Method of Study

1. First read the lesson notes carefully; these will give you a sound grounding in the topic and help you through any likely points of difficulty. Take the lessons one at a time, don't be tempted to take on more than one at once.
2. Then read the relevant chapter(s) in the text book. Detailed references are given to you later in this Introduction. Once you have read the lesson notes and your syllabus, if there is any irrelevant material in the chapters prescribed, this will become clear to you.
3. When you feel you have a good grasp of the material in the lesson, attempt to make your final version of your notes for each lesson. You should also then attempt the final activity in each lesson, which is to attempt, where appropriate, a diagrammatic summary of the lesson. You can then compare your diagrammatic summary with the one included at the end of the lesson.
4. Once you are sure that you have mastered all the material in the relevant lessons, attempt the practice test. If this proceeds satisfactorily, proceed to the next lesson. When you have finished a section of lessons, do the lettered test and send the answers to your tutor. Complete the tests which you send to your tutor in the time allowed and look up nothing. Remember that if you cheat and look up material, you will fool your tutor but not yourself, and ultimately will suffer because your tutor will have no idea of your real progress.

5. When you receive the corrected work from your tutor, consult the Specimen Answers carefully. Your tutor's comments, together with the Specimen Answers, should clear up any problems that remain.
6. If you still have persisting difficulties, contact your tutor in class, by post or by telephone. Try to be very precise in explaining to your tutor what your problem is: if you are not precise he or she may not be able to help you properly. Saying to your tutor something like "I can't do moles" doesn't give him or her a chance to help you. If you identify the problem more closely, help can be given.
7. Remember, finally, that in this, as in any other course, constant revision is vital. Many lessons are based on knowledge and theory gained from previous lessons. If these are not fully and constantly revised, the lessons which you are studying will become more difficult. Final Examination revision is vital, but this must be coupled with constant revision throughout the course.

Practical Coursework

This course contains as much help with practical work as it is possible for such a course to include, but it is difficult to give you extended guidance without face-to-face tuition.

It is not necessary to worry too much about your coursework at this stage. You should not think about attempting your coursework until you have a good grounding in basic chemistry. However, you should at an early stage discuss a timetable of coursework with your tutor.

The important thing to remember is that the coursework is not there to make the course more difficult for you. It is an opportunity for you to display your skills under non-exam conditions, and also your practical abilities. It gives you the chance to notch up some good marks before you take your exams.

Where do I do my coursework?

Ideally, you would do your practical work in a school or college where laboratory facilities are available but AQA do recognize that home learners may not have access to such facilities and have recommended some practical investigations which can be done from home. Discuss with your tutor how much practical work is possible, and how you can show familiarity with the necessary skills.

What skills do I need to demonstrate?

GCSE criteria for Science state that candidates should demonstrate the ability to:

- carry out experimental and investigative work in which they make plans, obtain and evaluate evidence and relate this to scientific knowledge and understanding
- use precise and systematic ways of making measurements and observations

In order to satisfy these GCSE criteria the AQA syllabus states that four different skill areas will be tested:

- Planning and Experimental Procedures
- Obtaining Evidence
- Analysing Evidence and Drawing Conclusions
- Evaluating Evidence

Your coursework should consist of a portfolio of at least two pieces of work, one of which covers all four skill areas.

How is the coursework marked?

Marks are given depending on how much thought, analysis and scientific knowledge have been used to plan, carry out and assess your experiments. You will see from your copy of the syllabus (under Coursework, Sc1 Assessment Criteria) that there are a set of statements for each Skill Area which should apply to your practical work. Out of a maximum mark of 63 awardable for coursework, 3 marks are reserved for levels of spelling and grammar. Your tutor will give you a mark out of 63 and also collect suitable work from you for moderation by the examiners, together with information about how the investigations were set up and why a particular mark was awarded.

What do I submit as coursework?

You will be expected to plan, tackle and write up an investigation (or number of investigations) in the field of chemistry. Your tutor will advise you on suitable projects which match the level of attainment you are aiming for. You should already have covered the background theory for your experiment(s) before proceeding. You can word-process or handwrite your reports, depending on what is more convenient for you.

A wide range of styles of coursework tasks is permissible. You should consider tasks which enable you to demonstrate your mastery of techniques, perhaps setting up experiments to verify laws or undertaking work targeted at individual skill areas.

You should be considering doing several pieces of coursework, as this will increase your chances of a good overall mark. This is possible as your tutor will send in the best mark that you have achieved for each skill area, so that it does not matter if you do not do particularly well in one.

How do I prove my coursework is all my own work?

You will need to give your tutor a great deal of information about any practical work that he or she does not supervise. You also need to verify that all the work is your own, except for any specific areas where you have had help from someone other than your tutor. Here you will need to state the nature of the help that you received on the forms provided for this purpose.

AQA's Suggestions for Investigations

With any science coursework, there are four skills you need to demonstrate: planning, obtaining evidence, analysing evidence and evaluating evidence.

If you are unable to obtain access to laboratory facilities at a school or college, AQA make the following suggestions for simple investigations:

Title	Equipment that may be used	Notes
The effect of temperature on sugar dissolving	Thermometer	May be only a low level of demand
Investigating the colouring in Smarties using chromatography	Blotting paper may suffice, or filter paper may be obtained from home brew suppliers	Low level of demand

Here are some investigations you could try if you have access to laboratory equipment:

- Rates – thiosulphate
- Rates – magnesium/acid
- Rates – marble chips/acid
- Rates – H₂O₂
- Energy mixing acids and alkalis
- Dissolving sugar cubes
- Burning alcohols
- Rusting of iron

- Making soluble salts
- Melting ice
- Loss of mass of a copper during electrolysis

Most of these investigations are covered in the OOL course and there are many other alternatives. Help will also be given with planning, recording results, drawing conclusions and evaluating your own work.

Using the Internet

All students would benefit from access to the Internet. You will find a wealth of information on all the topics in your course. As well as the AQA website (www.aqa.org.uk), you should get into the habit of checking the Oxford Open Learning site (www.ool.co.uk) where you may find news, additional resources and interactive features as time goes by. If you have not already done so, you may register for your free copy of *How to Study at Home*, our 200-page guide to home learning, or enrol on further courses. Put it on your Favourites list now!

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Sample Forms

Specification Title: Unit Code:
Centre Name: Centre No:

Authentication

This is to certify that marks have been awarded in accordance with the requirements of the specification and that every reasonable step has been taken to ensure that the work presented is that of the candidates named.

Any assistance given to candidates beyond that given to the class as a whole and beyond that described in the specification has been recorded on the Candidate Record Form(s) and has been taken into account. The marks given reflect accurately the unaided achievement of the candidates.

Signature(s) of teacher(s) responsible for assessment

Teacher 1
Teacher 2
Teacher 3
Teacher 4
Teacher 5
Teacher 6

Internal Standardisation of Marking (Continue overleaf if necessary)

Each centre must standardise the assessments for this unit across different teachers and teaching groups to ensure that all candidates in the centre have been judged against the same standards. If two or more teachers are involved in marking a unit, one of them must be designated as responsible for standardising the marking of all teachers at the centre who mark the unit.

The following declaration must be signed by the teacher responsible for ensuring standardisation. If all the work has been marked by the same person, that person should sign below.

I confirm that:

- (a) *I have marked the work of all candidates for this component;
- (b) *the procedure described in the specification has been followed at this centre to ensure that the marking is of the same standard for all candidates.

Signed: Date:

Signature of Head of Centre Date:

This form should be completed and sent to the moderator with the sample of centre-assessed work.

Chemistry

Centre Name: Centre No:

Candidate Name: Candidate No:

This side is to be completed by the candidate

Sources of advice and information

1. Have you received any help or information from anyone other than your subject teacher(s) in the production of this work? (Write YES or NO)

2. If you have answered YES, give details below. Continue on a separate sheet if necessary.

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3. If you have used any books, information leaflets or other materials (e.g. videos, software packages or information from the Internet) to help you complete this work, you must list these below, unless they are clearly acknowledged in the work itself. To present material copied from books or other sources without acknowledgement will be regarded as deliberate deception.

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...**NOTICE TO CANDIDATE**

The work you submit for assessment must be your own.

If you copy from someone else or allow another candidate to copy from you, or if you cheat in any other way, you may be disqualified from at least the subject concerned.

Declaration by Candidate

I have read and understood the Notice to Candidate (above). I have produced the attached work without any help apart from that which I have stated on this sheet.

Candidate's Signature: Date:

This form should be completed and attached to the candidate's work and retained at the Centre or sent to the moderator as required.