IGCSE Chemistry

Introduction

Welcome to your IGCSE Chemistry course. This introduction will serve as a guide to what you can expect from the course, and it will show you how to plan your study of this course effectively. Take your time to read this Introduction thoroughly before you start the lessons.

The course is designed to prepare students for examination in the **Edexcel IGCSE Chemistry specification (syllabus) (4CHO)**.

Please note:

In Spring 2012, Edexcel published a new issue of IGCSE Chemistry specification (4CHO) [Issue 4] for first teaching in September 2012 and first examination in **June 2013**. This is despite the fact that schools are already six months into a two-year course based on the previous specification. The changes affect your course in a small number of ways. No major topics have been added or deleted from the specification. We have immediately embarked on a process of revising your course materials in line with the published changes, but this will inevitably take some months to complete. In due course, we will send supplementary materials to all students who have enrolled on the IGCSE Chemistry course at no extra cost.

These changes should not affect your studies to any great extent. Our advice is to begin the course immediately and make the most of the study time available to you before the exam.

These changes affect all schools and colleges, and all published materials that aim to support learning for IGCSE Chemistry.

We should like to take this opportunity to apologise for any inconvenience caused by specification changes that are beyond our control. (2 March 2012)

The Arrangement of Lessons

The lessons are planned so that all the material and preparation required for the final examination papers is in the following six course modules:

Module 1: Principles of Chemistry
Module 2: Chemistry of the Elements
Module 3: Organic Chemistry
Module 4: Physical Chemistry
Module 5: Chemistry in Society
Module 6: Investigative Skills

It is advisable that you do the modules in order, as the content has been written to enable you to develop your knowledge and skills as you progress through the lessons.

The Course

The course is designed to develop (1) a broad understanding of chemical facts, concepts and principles, (2) skills in chemical investigation and (3) an ability to evaluate the benefits and drawbacks of modern scientific developments.

In combination with other suitable IGCSE entry subjects, the course is an ideal preparation for those who wish to go on to study Chemistry at AS and A2 level.

The course is designed to be accessible to students who may have only a limited previous background in science. If you have some background in Chemistry then you should find that some of the lessons build upon things that you have met before in your earlier studies.

The practical work described at various places in this course is to help to develop your skills for the practical-based components of the theory exams. You should try to carry out this work yourself; if you can undertake some of it at home, or have the opportunity to perform supervised laboratory work in the course of your studies, this will be a great help. Three of the lessons are devoted to the development of practical skills, and there is a very useful Appendix at the back of the textbook (pages 218-226), and the course pack to help you further.

NB. The exam will include written questions on practical-based study, so you should make sure that you have studied

these lessons carefully and have carried out some of the experiments yourself.

Textbook

The textbook that is referred to throughout this course is:

Jim Clark, *Edexcel IGCSE Chemistry* (2009, Pearson Education; ISBN: 978 0 435966 89 8)

You will need to use a copy of this textbook throughout the course; you can buy a copy through our website. It is referred to in every lesson and provides excellent approaches to the material. By using the textbook and the course, you will have very full coverage of all the material. The book has an accompanying CD-ROM which contains useful extra questions with answers.

Full answers to the Student Book questions are available to teachers and parents by emailing

customersolutions@pearson.com (for UK teachers and parents) or icsorders@pearson.com (for all other teachers and parents).

You should not need other books throughout the course but you may like to look in other chemistry books from time to time. If you feel that you would like to use a revision guide before the examination, you should ask your tutor which one they recommend.

Tiering and IGCSE Examination Entry

Science IGCSE examinations are not divided into different entry tiers. So candidates of all abilities sit the same exam paper.

Arrangement of Lessons and Textbook References

Chemistry IGCSE **Module 1: Principles of Chemistry**		
Lesson	*Title*	*Textbook Reference*
1	States of Matter and Atoms	pages 1-6, and 89-91
2	Atomic Structure	pages 6-12
3	Relative Formula Masses	pages 176-185, 190-192
4	Chemical Formulae and Chemical Equations **TMA A**	pages 33-40
5	Ionic Compounds	pages 17-22, 25-27
6	Covalent Substances	pages 13-18; 20-21; 27-29
7	Metallic Crystals	pages 20, 24-25
8	Electrolysis **TMA B**	pages 112-119

Module 2: Chemistry of the Elements		
Lesson	*Title*	*Textbook Reference*
9	The Periodic Table	pages 6-12, 99-101, Appendix B
10	Group 1 and Group 7 Elements	pages 102-111
11	Oxygen and Oxides	pages 54-59
12	Hydrogen and Water	pages 66, 93, 106, 123, 125
13	Reactivity Series	pages 55, 60-69, 109,139-140; 144-145
14	Tests for Ions and Gases **TMA C**	pages 93-95 (ions), 55, 58, 73, 92, 93, 95, (gases)

Module 3: Organic Chemistry		
Lesson	*Title*	*Textbook Reference*
15	Alkanes and Alkenes	pages 149-160, 156-62
16	Ethanol **TMA D**	pages 17, 154, 159-161

Module 4: Physical Chemistry		
Lesson	*Title*	*Textbook Reference*
17	Acids, Alkalis and Salts	pages 70-88
18	Energetics	pages 120-123, 202-208
19	Rates of Reaction	pages 41-50
20	Equilibria **TMA E**	pages 126-129

Module 5: Chemistry in Society		
Lesson	*Title*	*Textbook Reference*
21	Extraction and Uses of Metals	pages 139-145
22	Crude Oil	pages 163-168
23	Synthetic Polymers	pages 169-173
24	The Industrial Manufacture of Chemicals **TMA F**	pages 133-138

Module 6: Investigative Skills		
Lesson	*Title*	*Textbook Reference*
25	Designing and Carrying Out a Scientific Experiment	pages 218-225
26	Interpreting the Results of an Experiment	as above
	TMA G: Mock Exam, Paper 1	
	TMA H: Mock Exam, Paper 2	
	Appendix: Data	
	Glossary	

Internet Resources

In most lessons of the course, references to internet sites are given. These have been carefully selected to provide additional activities. Some of these have been designated as "Extension" activities.

These internet sites are an important tool to help your understanding of your Chemistry course, and you should make every effort to view at least the ones not designated as Extension.

If you do not have an internet connection at home, consider building in regular trips to a library or internet café as part of your study schedule. Please note that internet addresses are subject to change and cancellation – please inform your tutor if one no longer "works".

The Structure within each Lesson: How to Study

Front Page

The front page of each lesson shows:

- The **Title**.

- **Aims** for the lesson. These set out the position that you should reach after working through the lesson; keep these in mind while reading the lesson material. Paper 2 examines all of these aims, but Paper 1 does not examine the aims picked out in **bold** print. Where possible, some Paper 2 material has been identified with an asterisk (*) in the lesson content. However, some Paper 2 material is integrated with Paper 1 material and cannot be separately identified and you should refer to the lesson aims in **bold** to identify all Paper 2 content.

- **Context**. This shows how the lesson relates to the Specification and the overall study plan.

- **Reading**. This section gives the textbook references for the lesson. This is additional reading to accompany this course.

Lesson Notes

There then follow the notes; these work systematically through the subject material to be studied in the lesson. Read the notes carefully several times and carry out the activities until you feel that you have understood the broad outline of the theory involved, and then tackle the reading references.

The textbook may deal with some subjects in greater detail, and, as with the notes, you will probably need to read the passages several times. The textbook and accompanying CD-ROM also contain relevant questions, and at revision time you may want to return to these to further test your knowledge.

At the end of each lesson there is a list of new technical words whose meanings you should know. There is also a summary to which you can add your own comments.

Activities

Activities are placed in the notes at the relevant point. They are indicated as follows:

Activity 1	Chemists can only work with the starting materials available to them. Try to decide from which of the six places listed above these substances come. You may find that some of the substances come from more than one place. *Salt; penicillin; water; pearls; iron; milk; wood; diamond; yeast extract; wool; paper; zinc; honey; beer; blood; cotton; gold; glass; concrete; oxygen.*
	

The pencil symbol indicates that you should make your own notes in the space provided.

Self-Assessment Tests

Most lessons conclude with either a Self-Assessment Test or a Tutor-Marked Assignment. Only tackle these when you feel that you have fully mastered the material in the lesson.
If it is a Self-Assessment Test, first try to check your answers by referring back to the lesson, and then compare your answers with those given right at the end of the lesson.

Tutor-Marked Assignments

After every few lessons there is a Tutor-Marked Assignment (TMA). These will thoroughly check your understanding of the preceding two lessons. You should send your answers to your tutor, who will return your marked script, together with a set of suggested answers.

Revision

Do **not** leave all your revision until the end of the course! You will need to revise thoroughly for your examination, but frequent revision throughout the course is **essential**. Plan your revision sensibly, and re-read as you feel necessary, if your knowledge is beginning to fade.

The last two TMAs in the course include a mock exam of two papers, following closely the format of the exam itself. You

are recommended to study the online practice exam and mark scheme (see the section 'Past Papers' below) before attempting this TMA and sending it to your tutor. It is also a good idea to restrict yourself to the time specified for the exam, so you have practice writing under time pressure.

Checking the Specification

As you know, this course has been written to cover the contents of the **Edexcel Specification 4CH0 [Issue 4]** which is available to download at

http://www.edexcel.com/quals/igcse/igcse09/chemistry/Pages/default.aspx

To see this you will need Adobe Acrobat reader on your computer which you can download freely at:

http://get.adobe.com/uk/reader/

In the specification, you should look in particular at:

- The Qualification Content on pages 3 -14
- The Assessment Objectives on page 16

NB. Please make sure that you look at the current issue of the specification which is for first examination in June 2013.

You should check the specification online periodically throughout the course so bookmark the Edexcel IGCSE Chemistry homepage.

The Edexcel International General Certificate of Secondary Education (IGCSE) in Chemistry is designed for use in schools and colleges. It is part of a suite of IGCSEs in Science offered by Edexcel. The course gives students the opportunity to experience chemistry within the context of their general education.

The Edexcel IGCSE in Chemistry enables students to:

- learn about the unifying patterns and themes of chemistry

- appreciate the practical nature of chemistry, acquiring experimental and investigative skills based on correct and safe laboratory techniques
- appreciate the importance to scientific methods of accurate experimental work and reporting
- form hypotheses and design experiments to test them
- develop a logical approach to problem solving in a wider context
- understand the widespread importance of chemistry and the way materials are used in the world
- appreciate how the work of the chemist has social, industrial, technological, environmental and economic consequences for the community
- prepare for more advanced courses in chemistry and for courses which require students to have knowledge of chemistry.

Key Features and Benefits of the Edexcel Specification

The IGCSE in Chemistry:

- includes aspects of science appropriate for the 21st century
- has straightforward linear assessment
- assesses investigative skills through examination
- provides a sound foundation for progression to AS and A2 examinations in Chemistry

The Edexcel IGCSE Chemistry specification can be accessed from the homepage:

http://www.edexcel.com/quals/igcse/igcse09/chemistry/Pages/default.aspx

Students entering for this specification may not, in the same series of examinations, enter for the Edexcel IGCSE in Science (Double Award (4SC0).

The Examination

The examination you will sit consists of two papers. There is no separate practical exam and no practical coursework component; testing of practical skills is built into both of the theory papers.

Chemistry Paper 1 Paper code: 4CH0/1C

This is a two-hour examination paper. The total number of marks is 120, two thirds of the overall total. The paper examines all of the Specification content except those items printed in **bold** (see also in the lesson Aims and Context), and all of the assessment objectives.

Chemistry Paper 2 Paper code: 4CH0/2C

This is a one-hour examination paper. The total number of marks is 60, one third of the overall total. This paper examines all of the Specification content, including those items printed in **bold** (see also in the lesson Aims and Context), and all of the assessment objectives.

In both papers there will be a range of compulsory short-answer, structured questions, which gradually increase in difficulty to ensure accessibility for less-able students, as well as to stretch more-able students.

In both papers, students may be required to perform calculations, draw graphs and describe, explain and interpret chemical phenomena. Some of the question content may be unfamiliar to students; these questions are designed to assess data-handling skills and the ability to apply biological principles to unfamiliar information. Questions targeted at grades A* – B will include questions designed to test knowledge, understanding and skills at a higher level, including some questions requiring longer prose answers.

The IGCSE qualification will be graded and certificated on an eight-grade scale from A* to G. Students whose level of achievement is below the minimum standard for Grade G will receive an unclassified U. Where a candidate is unclassified, this will not be recorded on the IGCSE certificate.

You should read the specification periodically throughout your course, so bookmark the Edexcel IGCSE Chemistry homepage.

You will find some sample assessment materials on the Edexcel website. These show you what to expect in your exam, so make sure you look at them and work through the sample questions. You can find this material at:

http://www.edexcel.com/quals/igcse/igcse09/chemistry/Pages/default.aspx

(Click on the link to 'Specification' and this will also give you access to sample assessment materials for Issue 4 of the specification for first examination in June 2013.)

If you do not have access to the Internet, it is possible to buy a paper copy from Edexcel. The contact details are:

Edexcel Publications
Adamsway
Mansfield
Notts NG18 4FN

Tel: 01623 467 467
Fax: 01623 450 481
Email: publication.orders@edexcel.com

Past Papers

At the time of writing, past exam papers for the previous issue of the specification are available for download from the Edexcel website at:

http://www.edexcel.com/quals/igcse/igcse09/chemistry/Pages/default.aspx

You can also use these as exam practice. You will find the past papers under the link 'Exam paper'. Do not send these to your tutor for marking.

A mock examination that is marked by your tutor is provided as part of this course.

Your Tutor

You have plenty of resources to help you in your studies; your course file, your textbook, internet resources and your tutor. You should make good use of your tutor to help you

with any difficulties that you may have during the course especially at the start.

And finally... very good luck with your studies!

Michael Jones