

## Science

### Subjects offered

#### **Biology**

**Exam Offered:** AQA Biology AS level (1411) / AQA Biology A2 Level (2411)

#### **Chemistry**

**Exam Offered:** AQA Chemistry AS level 1421 / A2 Level AQA 2421

#### **Geology**

**Exam Offered:** OCR AS Geology (H087)

#### **Physics**

**Exam Offered:** AQA Physics AS level (5451) / AQA Physics A2 Level (6451)

#### **Science in Society**

**Exam Offered:** AQA Science in Society AS level (1401)

### Teachers for 6<sup>th</sup> Form

**Margaret Keegan: Director of Science and PE- Deputy Headteacher/ Chemistry teacher**

Specialist Areas of Interest: Physical Chemistry

Email address: [margaret\\_keegan@fc.tchs.uk.net](mailto:margaret_keegan@fc.tchs.uk.net)

**Mr E Feeney: Teacher in Charge of Biology and Science in Society.**

Specialist Areas of Interest: Biochemistry and DNA technology

Email address: [enda\\_feeney@fc.tchs.uk.net](mailto:enda_feeney@fc.tchs.uk.net)

**Mrs M Foster: Teacher of Biology.**

Specialist Areas of Interest: Bacteriology and Virology

Email address: [melanie\\_foster@fc.tchs.uk.net](mailto:melanie_foster@fc.tchs.uk.net)

**Mr J Shujaat: Teacher of Biology.**

Specialist Areas of Interest: Human Biology

Email address: [javed\\_shujaat@fc.tchs.uk.net](mailto:javed_shujaat@fc.tchs.uk.net)

**Fred Matthews: Examinations officer/Chemistry teacher**

Specialist areas of interest: Organic Chemistry and Spectroscopy

Email address: [fred\\_matthews@fc.tchs.uk.net](mailto:fred_matthews@fc.tchs.uk.net)

**Elaine Rosemond: Chemistry teacher**

Specialist areas of interest: Organic and Physical Chemistry

Email address: [Elaine\\_rosemond@fc.tchs.uk.net](mailto:Elaine_rosemond@fc.tchs.uk.net)

**Mark Baldwin: Chemistry teacher and Mountain Leader**

Specialist areas of interest: In addition to Chemistry Information Technology and Outdoor Education.

Email address: [mark\\_baldwin@fc.tchs.uk.net](mailto:mark_baldwin@fc.tchs.uk.net)

**Rachel. Roger: Teacher of Geology and Chemistry.**

Specialist areas of interest: Earth Structure & Plate Tectonics, exam marker for OCR.

Email address: [rachel\\_roger@fc.tchs.uk.net](mailto:rachel_roger@fc.tchs.uk.net)

**Jim Morris: Teacher in Charge of Geology.**

Specialist Areas of Interest: Rocks – Processes & Products (Sedimentary, Igneous & Metamorphic), Palaeontology, Geological Structures

Email address: [jim\\_morris@fc.tchs.uk.net](mailto:jim_morris@fc.tchs.uk.net)

**Derek Lusby: Teacher in Charge of Physics**

Specialist Areas of Interest: Astronomy and Physics.

Email address: [Derek\\_Lusby@fc.tchs.uk.net](mailto:Derek_Lusby@fc.tchs.uk.net)

**Daniel Collins: Physics Teacher**

Specialist areas of interest: Meteorology, Atomic and Molecular Physics and Football.

Email address: [Daniel\\_Collins@fc.tchs.uk.net](mailto:Daniel_Collins@fc.tchs.uk.net)

## **Wider Learning Opportunities**

We encourage students to attend the public lectures held at UCL on Friday evenings, as well as those held at Trinity.

We offer students the opportunity of entering the British Physics, Chemistry or Biology Olympiads. These competitions try to challenge and stimulate gifted students with an interest in the Sciences to expand and extend their talents. In offering a wider syllabus than A-level, it allows gifted students to demonstrate their knowledge and to be suitably rewarded and publicly recognised by the award of medals, certificates and other prizes. It is hoped that competing in the Olympiad will encourage students already interested in this valuable, wide-ranging and rewarding subject to continue their study beyond A-level.

Students will be informed of other competitions and challenges via first class email as and when they arise e.g Cambridge University Essay Prize and ASE ‘5 for Sydney’ plus numerous others.

All A level science students will be invited to follow an Open University Short course as part of the Young Applicants in Schools Scheme. We would strongly encourage students to partake in this opportunity to add breadth and depth to their AS/A2 studies.

We offer e-mail study support services, and a tutorial system.

There are numerous ‘Aimhigher’ events and activities offered to science students in year 12 and 13 by local Higher Education Institutions e.g. ‘Chemistry of Dentistry’, ‘Spectroscopy’ ‘Health Summer School’, and ‘Darwin Student Summit’. These

courses will be advertised to students via first class email as and when the school receives updates. Students are strongly encouraged to partake as appropriate.

Dependent upon the specific course of study we encourage students to visit the vast range of resources available through museums eg Science Museum, Natural History Museum; Geological Societies eg Essex Rock & Mineral Society, Essex Field Club; and through visiting local sites of interest eg Walton-on-the-Naze.

For students studying Biology or Geology within the school the use of fieldwork allows students to develop their investigative skills and provides a greater understanding of how scientific research can be used to assess people's impact on the environment. Biology students are provided with an opportunity to attend an ecology course at one of the field study centres. We will use fieldwork to allow students to gain a strong understanding of "*How Science Works*"; through the development and practice of investigative skills and through the consideration of how scientific evidence may be used to assess people's impact on the environment.

## **Department Learning and Teaching Policy and Practice**

Studying Sciences at AS or A2 level requires much more from you than learning a set of facts. You must develop your own ideas in order to be successful in both practical and theoretical aspects of the course. Your teachers expect to be able to work alongside you in the common enquiry of science and its place within the wider culture

"Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius -- and a lot of courage -- to move in the opposite direction."

"Imagination is more important than knowledge."

Albert Einstein

All of the Sciences are demanding but rewarding subjects suitable for students who

- have an interest in, and enjoy the particular Science subject;
- want to find out how things work in the physical and/or natural world;
- enjoy applying their minds to solving problems;
- enjoy carrying out investigations by the application of imaginative, logical thinking;
- want to use one or more Science subjects to support other qualifications or to progress onto further studies or employment.

## **Master Learner**

In order to be a successful Science student you will need to develop various skills, attitudes, attributes, and behaviours. We group these together as steps on your **Master Learner Learning Journey**. We believe that any student can achieve the very highest quality work and grades. Improvement and excellence is achieved through

commitment, focus and effort. In the table below you can see some broad descriptions of steps that you might take on your journey. We have called these steps Novice, Apprentice, Practitioner, Expert, and Master. It is possible that you will start your journey at Novice or Apprentice level, it is hoped that by the end of your course you will be working at Expert or Master level. The sooner you work at the higher levels the better your time on the course and, therefore, your grades will be. There will be a formal Master Learner Assessment and Review at least twice a year.

## Master Learner Learning Journey.

**Limited:** Currently demonstrating a limited ability as a learner. Level of knowledge and understanding varies significantly across major areas of the specification and the motivation to address this is currently lacking. Demonstrates poor time management and is often behind with work. Seems to have little real interest in the subject and is not particularly proactive in asking questions or seeking answers. Lacks the ability or motivation to work with any real degree of independence. Is unlikely to be successful in study of the Sciences without a change of attitude and application.

**Basic:** A student working at basic level needs to demonstrate that he/she can work well under teacher direction and with some degree of independence. Knowledge and understanding varies significantly across major areas of the specification and this is an area that would need to be addressed before he/she could be assessed as attaining basic level in the Sciences. To reach basic level student needs to demonstrate that he/she can prioritise. In addition a student working towards this level has to learn to be more resourceful and resilient and to be proactive in asking questions and seeking solutions to problems. It is important that an adequate amount of time is spent on addressing difficult concepts and appropriate revision strategies are employed.

**Competent:** To become competent students need to work with a higher degree of independence in addition to working well under teacher direction. A competent student manages time reasonably well, asks good questions and is proactive in seeking answers. He/She is a good communicator and collaborates with others well, recalling and using scientific knowledge that reflects his/her ability from within the constraints of the specification. He/She shows good understanding of the principles and concepts used and can apply knowledge reasonably well in familiar contexts. He/She can plan investigations, has good observation skills, can gather accurate, precise and reliable data when carrying out practical work and has the ability to draw informed conclusions.

**Confident:** To become confident students need to work with a high degree of independence, to manage time very effectively, to formulate and ask very good questions and to demonstrate that he/she is keen to learn more. He/She needs to become practically adept, a very good communicator, to collaborate effectively with others and be confident to take risks.

Students need to recall and use scientific knowledge that reflects the content of the exam specification and to show very good understanding of the principles and concepts covered. He/She needs to select only appropriate information from which to solve problems. A confident student can bring together fundamental principles from different content areas of the subject and demonstrates a reasonable understanding of the relationships between these. He/She can carry out calculations well and can apply knowledge to familiar contexts and is beginning to do so effectively in unfamiliar situations.

**Fluent:** To reach fluent level students need to recall and use scientific knowledge that goes beyond the constraints of the exam specifications and reflects his/her interests and aspirations. He/She needs to show excellent understanding of the principles and concepts used, selecting only appropriate information with which to solve problems. At this level students need to demonstrate an ability to work independently and to manage time very effectively. A fluent student has excellent practical skills, questions well, and is curious to find out more and proactive in relation to this. He/She is an effective communicator, collaborates well, and is creative and very confident to take risks. He/She can bring together fundamental principles from different content areas of the subject and demonstrates a clear understanding of the relationships between these. He/She can apply knowledge well in both familiar and unfamiliar contexts, demonstrating excellent understanding of the underlying relationships between physical quantities and can carry out all elements of extended calculations correctly and without guidance.

## **Biology**

**Exam Offered:** AQA Biology AS level (1411) / AQA Biology A2 Level (2411)

### **Assessment Policy and Practice:**

You will be assessed on a day-to-day basis, periodically and transitionally

#### **Day-to-Day:**

You will need to reflect and comment on your homestudy before submitting it to the teacher for assessment. You will receive comments and a grade for this work. You will keep an exercise book for independent study in which work will be peer and self assessed.

#### **Periodic:**

You will receive comments and grades for your investigative and practical skills. Research work will be self and peer assessed. You will receive a progress report, a mock report and 2 master learner current performance reports per year.

#### **Transitional:**

You will sit the Unit 1 and Unit 2 AQA AS exams at the end of Y12 (Mock exams for Unit 1 and unit 2 will be sat in January and May respectively).

You will sit the Unit 4 AQA A2 exam in January and the Unit 5 exam in June of Y13.

### **Course Outline:**

- **Year 12**

| Autumn Term   | Spring Term  | Summer Term   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Intro to the course</li> </ul> | <ul style="list-style-type: none"> <li>• Mock exam on</li> </ul> | <ul style="list-style-type: none"> <li>• Complete Unit 2</li> </ul> |

|   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Unit 1 Biology and Disease</li> <li>• Pathogens</li> <li>• Digestion</li> <li>• Animal Cells and Plasma membranes; Transport processes</li> <li>• Lung structure/function and disease</li> <li>• Heart structure/function and disease</li> <li>• Immunology</li> </ul> | <p>Unit 1 Biology and Disease</p> <ul style="list-style-type: none"> <li>• Intro to Unit 2</li> <li>• Structure of DNA; Meiosis</li> <li>• Carbohydrates and plant cells</li> <li>• Variation</li> <li>• Genetic diversity</li> <li>• The cell cycle</li> <li>• Gas exchange; Water transport</li> <li>• Principles of Taxonomy</li> <li>• Genetic variation in bacteria</li> <li>• Species Diversity</li> </ul> | <ul style="list-style-type: none"> <li>• Revision</li> </ul>          |
| <p>Suggested reading/resources</p> <p>FirstClass (online school community)</p> <p>AS Nelson thornes textbook</p>  |  |   |
| <p>Key pieces of work</p> <ul style="list-style-type: none"> <li>• Factsheet on cholera</li> <li>• Enzyme practical reports</li> <li>• AQA questions on cells and microscopy</li> <li>• AQA questions on the lungs and heart</li> <li>• W/S' on Immunology</li> </ul>   | <ul style="list-style-type: none"> <li>• Unit 3: Internal Assessment – Investigative and practical skills (ISA)</li> <li>• AQA questions on DNA and other topics</li> </ul>  | <ul style="list-style-type: none"> <li>• Mock Unit 1 and 2</li> </ul> |

• **Year 13**

|   |   |   |
|---|---|---|
| <p>Autumn Term</p> <ul style="list-style-type: none"> <li>• Unit 4</li> </ul> | <p>Spring Term</p> <ul style="list-style-type: none"> <li>• Unit 4 AQA A2 Exam</li> </ul> | <p>Summer Term</p> <ul style="list-style-type: none"> <li>• Mock Unit 5 exam</li> </ul> |
|---|---|---|

|  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Populations and ecosystems</li> <li>• Photosynthesis</li> <li>• Respiration</li> <li>• Energy and Ecosystems</li> <li>• Nutrients cycles</li> <li>• Ecological succession</li> <li>• Inheritance and selection</li> </ul> | <ul style="list-style-type: none"> <li>• Intro to Unit 5</li> <li>• Response to stimuli</li> <li>• Coordination</li> <li>• Muscle contraction</li> <li>• Homeostasis</li> <li>• Feedback mechanisms</li> <li>• Genetic control of protein structure and function</li> <li>• Control of gene expression</li> <li>• DNA technology</li> </ul> |  |
| <p>Suggested reading/resources</p> <p>FirstClass (online school community)</p> <p>AS Nelson thornes textbook</p>   |   |  |
| <p>Major pieces of work</p> <ul style="list-style-type: none"> <li>• AQA practice questions on photosynthesis and respiration</li> <li>• Practical report on succession</li> </ul>   | <ul style="list-style-type: none"> <li>• AQA practice questions</li> </ul>  |  |

## **Wider Reading and Study Biology:**

### **Books**

Nelson Thornes AQA Biology AS Exclusively endorsed by AQA  
 Glenn Toole Susan Toole Nelson Thornes 0748798137

Collins AS Biology for AQA  
 Keith Hirst Harper Collins 0007268211

Oxford AS Biology for AQA  
 Michael Kent Oxford University Press 0199152675

Biology for AS  
Mike Bailey Bill Indge Martin Rowland Hodder Education 0340945990

Understanding Biology for Advanced Level  
*Glenn Toole, Susan Toole Hutchinson Education 0091700515*

Biology *M. Rowland Nelson Thornes 0174384254*

Advanced Biology *J. Simpkins, J.I. Williams Bell & Hyman 071351387X*

Biology *Julian Sutton Macmillan 0333658604*

Biology – A Functional Approach *M.B.V. Roberts Nelson 0174480199*

Biological Science *Taylor, Green, Stout Cambridge University Press 0521377854*

Advanced Biology *M. Jones, G. Jones Cambridge University Press 0521484731*

Biology Heineman Advanced Science *Ann Fullick Harcourt Education 0435570889*

Advanced Biology – Principles and Applications  
*C.J.Clegg, D.G. MacKean John Murray 0719553741*

Biology – Principles and Processes *M. Roberts, M. Reiss, G. Manger ?*

Nelson Tools, Techniques and Assessment in Biology Nelson Thornes 0174482736

## **Revision Guides**

CGP AS and A2 Level Biology AQA Co-ordination Group Publications  
1841463957

Collins Student Support Materials for AQA Unit 1 and Unit 2 Harper Collins  
0007268211

NAS Make the Grade in AS and A2 Biology ?

Upgrade A-level Biology *Glenn and Susan Toole Stanley Thornes 074872768X*

The Complete A-Z Biology Handbook *Bill Indge Hodder & Stoughton*  
*0340663731*

Advanced Biology Revision through diagrams *W.R. Pickering Oxford University*  
*Press 0199141975*

Longman and Letts Revision Guides ?

## **Websites**

Exam Board: [www.aqa.org.uk](http://www.aqa.org.uk)

Nelson thornes online resource: [www.nelsonthornes.com/learningspace/](http://www.nelsonthornes.com/learningspace/)

Institute of Biology: [www.iob.org](http://www.iob.org)

Wellcome Trust: [www.wellcome.ac.uk](http://www.wellcome.ac.uk)

## **Statistics**

Maths for Advanced Biology *Alan Cadogan, Robin Sutton*

The Open University Project Guide *Neil Chalmers, Phil Parker*

## **Magazines**

Biological Sciences Review

Biologist – The Journal of the Institute of Biology

New Scientist

## **Popular Science Titles**

The Origin of Species *Charles Darwin Nuvision Publications 1595471375*

Almost Like a Whale – The origin of Species updated *Steve Jones Doubleday 0385409850*

The Selfish Gene *Richard Dawkins The University Press 0192177737*

The Blind Watchmaker *Richard Dawkins Penguin Books 0140144811*

The Origins of Life *John Maynard Smith Oxford University Press 019286209*

The Double Helix *James D. Watson Simon & Schuster 074321630X*

Y: The Descent of Men *Steve Jones Little Brown Book Group Ltd 0618139303*

## **Chemistry**

**Exam Offered:** AQA Chemistry AS level 1421 / A2 Level AQA 2421

## **Assessment Policy and Practice:**

Students are expected to undertake a minimum of 5 hours homework per week. In addition to set homework, which may take a variety of forms, students are expected to supplement class notes using a range of Chemistry texts. It is also expected that students will enhance their understanding of Chemistry by independent reading. Homework is marked in accordance with departmental policy. Throughout the course, students are expected to keep a log per module of all homework set, together with grades awarded. Test results are also recorded here. Extended investigations and projects are included in each module.

You will be assessed on a day-to-day basis, periodically and transitionally

### **Day-to-Day:**

You will have an A4 exercise book where class work tasks and practical write ups will be recorded. Your formative understanding will be assessed by completing the summary questions and exam style questions in your text book. These will mainly be marked in class. You will keep an additional exercise book for independent study. All Chemistry students are expected to spend at least 2 hours a week on self set independent study. Evidence of this work is to be kept in an A4 notebook and handed in to Miss Keegan on a weekly basis. Students will receive feedback via 'firstclass' email and are therefore expected to check their email regularly. Students are also expected to support each other through use of electronic forums via first class.

### **Periodic:**

There are several major pieces of Assessed Home Study tasks spread throughout each module. These consist mainly of banks of past exam paper questions which will be marked and commented on by the teacher. Practical work is a major component of Chemistry. You will complete several practice ISA exams which will be self-marked and/or peer assessed in preparation for the real ISA exam. There are opportunities for extended or self-directed tasks in each module. In addition you will be expected to complete 6PSA practical assignments during the course of the year. There will be a half termly test plus a mock exam for each module towards the end of the course.

### **Transitional:**

You will sit the Unit 1 and Unit 2 AQA AS exams at the end of Y12 (Mock exams for Unit 1 and unit 2 will be sat in April/May).

You will sit the Unit 4 AQA A2 exam in January and the Unit 5 exam in June of Y13.

## **Course Outline:**

### **Year 12**

| Autumn Term   | Spring Term   | Summer Term   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• Atomic structure</li> <li>• Amount of substance</li> <li>• Bonding</li> <li>• Periodicity</li> <li>• Introduction to Organic Chemistry</li> <li>• Haloalkanes</li> <li>• Alkenes</li> <li>• Alcohols</li> </ul>                        | <ul style="list-style-type: none"> <li>• Energetics</li> <li>• Kinetics</li> <li>• Equilibria</li> <li>• Redox Reactions</li> <li>• Group 7, the Halogens</li> <li>• Group 2, the alkaline earth metals</li> <li>• Extraction of Metals</li> <li>• Analytical Techniques</li> </ul> | <ul style="list-style-type: none"> <li>• Complete Unit 2</li> <li>• Revision</li> <li>• Study leave for Exams</li> <li>• Start Unit 4 – project work</li> </ul> |
| <p>Suggested reading/resources</p> <p>FirstClass (online school community)</p> <p>AS Nelson Thornes textbook</p>  |   |   |
| <p>Key pieces of work</p> <ul style="list-style-type: none"> <li>• Unit 3: Internal Assessment – Investigative and practical skills (ISA)</li> <li>• Unit 3: 3 Practical Skills Assignments (PSA)</li> <li>• Internal test October</li> <li>• Internal Test December</li> </ul> | <ul style="list-style-type: none"> <li>• Unit 3: Internal Assessment – Investigative and practical skills (ISA)</li> <li>• Unit 3: 3 Practical Skills Assignments (PSA)</li> <li>• Internal test February</li> <li>• Internal Test April</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Mock exams for Units 1 and 2</li> </ul>  |

- **Year 13**

| Autumn Term | Spring Term | Summer Term |
|-------------|-------------|-------------|
|-------------|-------------|-------------|

|   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• Kinetics</li> <li>• Equilibria</li> <li>• Acids and bases</li> <li>• Nomenclature and isomerism in Organic Chemistry</li> <li>• Compounds containing the carbonyl group</li> <li>• Aromatic Chemistry</li> <li>• Amines</li> <li>• Amino acids</li> <li>• Polymers</li> <li>• Organic synthesis and analysis</li> <li>• Structure determination</li> </ul> | <ul style="list-style-type: none"> <li>• Unit 4 AQA A2 Exam</li> <li>• Thermodynamics</li> <li>• Periodicity</li> <li>• Redox equilibria</li> <li>• Transition metals</li> <li>• Reactions of inorganic compounds in aqueous solutions</li> </ul>   | <ul style="list-style-type: none"> <li>• Mock Unit 5</li> <li>• Revision</li> </ul> |
| <p>Suggested reading/resources</p> <p>FirstClass (online school community)</p> <p>AS Nelson Thornes textbook</p>  |   |   |
| <p>Major pieces of work</p> <ul style="list-style-type: none"> <li>• Unit 6: Internal Assessment – Investigative and practical skills (ISA)</li> <li>• Unit 6: 3 Practical Skills Assignments (PSA)</li> <li>• Internal test October</li> <li>• Mock Unit 4</li> </ul>  | <ul style="list-style-type: none"> <li>• Unit 6: Internal Assessment – Investigative and practical skills (ISA)</li> <li>• Unit 6: 3 Practical Skills Assignments (PSA)</li> <li>• Internal test February</li> <li>• Internal Test April</li> </ul> | <ul style="list-style-type: none"> <li>• Mock Unit 5</li> </ul>                     |

**Wider Reading and Study Chemistry:**

## **Textbooks provided by Chemistry Department**

AQA Chemistry (AS), Lister T, Renshaw J Nelson Thornes, 978-0-7487-8280-2  
AQA Chemistry (A2), Lister T, Renshaw J Nelson Thornes, 978-0-7487-8279-6

## **Data books**

Chemistry Data Book, Stark and Wallace, John Murray 0 7195 3951 X  
Nuffield Advanced Science Book of Data, Longmans 0 582 35448 X

## **Recommended reference textbooks (Y12 and Y13)**

AQA AS Chemistry, Saunders N, Saunders A, Oxford, 978-0-19-915273-5  
AQA A2 Chemistry, Harwood P, Collins 978-0-00-726824-5  
AQA AS and A2 Study guides Collins unit 1 978-0-00-726825-2  
AQA AS and A2 Study guides Collins unit 2 978-0-00-726826-9  
AQA AS and A2 Study guides Collins unit 4 978-0-00-726827-6  
AQA AS and A2 Study guides Collins unit 5 978-0-00-726828-3  
Advanced Chemistry, Clugston & Flemming, Oxford UP0 19 914633 0  
A-Level Chemistry (4th Edition), Ramsden, Stanley Thornes 0 7487 5299 4  
AS and A Level Chemistry through Diagrams, Lewis, Oxford UP0 19 914198 3  
Calculations for A-Level Chemistry, Ramsden, Stanley Thornes 0 7487 1594 0  
Calculations in AS/A Level Chemistry, Clark, Longman 0 582 41127 0  
Chemistry in Context, Hill and Holman, Nelson 0 17 448191 8  
Chemistry in Context - Laboratory Manual and Study Guide, Nelson 0 17 448231 0  
Complete A-Level Chemistry, Kelly, Collins Educational 0 00 322325 6  
Organic Chemistry, Energetics, Kinetics and Equilibrium, Jarvis, Nelson  
0 7487 7656 7  
Periodicity, Quantitative Equilibria & Functional Group Chemistry,  
Beavon & Jarvis, Nelson 0 7487 7657 5  
Transition Metals, Quantitative Kinetics & Applied Organic Chemistry,  
Jarvis, Nelson 0 7487 7658 3  
Structure, Bonding & Main Group Chemistry, Beavon & Jarvis, Nelson 0 7487 7655 9  
Introduction to Advanced Chemistry, Earl and Wilford, John Murray 0 7195 8587 2  
Moles, Formulae and Equations, Edexcel Press UG004373

*NOTE: There are inspection copies of most of these books in the Chemistry preparation room.*

## **Popular Science**

Mendeleev's Dream, Paul Strathern, Penguin 0 1402 8414 1  
The Periodic Table, Primo Levi, Penguin 0 1402 9661 1

## **Websites:**

Exam Board: [www.aqa.org.uk](http://www.aqa.org.uk)

Nelson Thornes online resource: [www.nelsonthornes.com/learningspace/](http://www.nelsonthornes.com/learningspace/)

Royal Society of Chemistry: [www.rsc.org](http://www.rsc.org)

## Geology

**Exam Offered:** OCR AS Geology (H087)

### Assessment Policy and Practice:

You will be assessed on a day-to-day basis, periodically and transitionally

#### **Day-to-Day:**

Individually: you will have sections of your class and home study work assessed by a teacher / peer / self, using official mark schemes from which comments and a grade will be provided.

#### **Periodic:**

You will receive comments for major pieces of investigative and practical work. Research work will be self and peer assess. You will receive a progress report, a mock report and 2 master learner current performance reports per year.

#### **Transitional:**

You will sit 2 public exam papers at the end of year 12 and 2 practical (one investigative and one evaluative) assessments in March - April. Mock exams will be carried out in February & May.

### Course Outline:

- **Year 12**

| Autumn Term  | Spring Term  | Summer Term   |
|--|--|---|
| Unit F791 <ul style="list-style-type: none"><li>• Earth structure</li><li>• Earthquake</li></ul> Unit F792 <ul style="list-style-type: none"><li>• The Rock Cycle</li><li>• Igneous processes &amp; produces</li><li>•</li></ul> | Unit F791 <ul style="list-style-type: none"><li>• Continental drift, sea floor spreading &amp; plate tectonics</li><li>• Geological structures</li></ul> Unit F792 <ul style="list-style-type: none"><li>• Sedimentary Processes &amp;</li></ul> | <ul style="list-style-type: none"><li>• Complete any outstanding course</li><li>• Revision</li><li>• Tutorials</li></ul> Unit F793 <ul style="list-style-type: none"><li>• Evaluative task</li></ul> Unit F793 <ul style="list-style-type: none"><li>• Centre-based or fieldwork task</li></ul> |

|   |   |   |
|---|---|---|
|   | Products <ul style="list-style-type: none"> <li>• Metamorphic processes &amp; products</li> <li>• Mock Written Papers</li> </ul>  | Mock exams as required  |
| Suggested reading/resources<br><br>FirstClass (online school community)<br><br>OCR Geology by Heinemann   |   |   |
| Key pieces of work <ul style="list-style-type: none"> <li>• OCR practice questions – Earths Structure, Earthquakes, The Rock Cycle, Igneous processes &amp; products</li> </ul> | <ul style="list-style-type: none"> <li>• OCR practice questions – Plate Tectonics &amp; Geological structures, sedimentary / metamorphic processes &amp; products.</li> <li>• Mock Exams</li> </ul> | <ul style="list-style-type: none"> <li>• OCR practice exam questions – all areas</li> <li>• Practical Exams: 1 Practical &amp; 1 Evaluative task or</li> <li>• 1 Fieldwork assessment.</li> </ul> |

## Wider Reading and Study Geology:

### Books

#### **General**

Allaby A, *A dictionary of earth science*, Oxford University Press, 2003 0199211949  
 Duff D, *Holmes' principles of physical geology*, 4th edition, Chapman and Hall, 1993 0748743812  
 Edwards, D & King C, *Geoscience*, Hodder & Stoughton Educational, 1999 1402005148  
 Kearey P, *The encyclopedia of the solid earth sciences*, Blackwell Scientific, 1994 062036990  
 Lapidus DF, *Collins dictionary of geology*, Harper, 2003 0007232268  
 McLeish, A, *Geological science*, Nelson, 1993 ?  
 Pellant C and Phillips R, *Rocks, minerals and fossils of the world*, Pan, 1990 ?  
 Porter SC and Skinner BJ, *The Dynamic Earth: An Introduction To Physical Geography*, Wiley, 2000 0471152285  
 Kearey P, *The new Penguin dictionary of geology*, Penguin 0140512772  
 Geopix website at [www.geopix.org](http://www.geopix.org) . geological photographs and study guides for AS/A2 Level.

#### **Module F791: Global Tectonics and Geological Structures**

Bolt BA, *Earthquakes*, Freeman, 5th Edition, 2004 0716775484  
 Erickson J, *Volcanoes and earthquakes*, Tab Books, 1990 0830619429  
 Hamblin WK, *Earth's dynamic systems*, Prentice Hall, 2003 0131420666  
 Kearey P & Vine FJ, *Global Tectonics*, Blackwell, Oxford, 1996 0865429243  
 Monroe JS and Wicander R, *Physical geology: exploring the earth*, Brooks Cole, 2001 0534399878

Plummer CC and McGeary D, *Physical Geology*, McGraw Hill, 1996 0073301787  
Press F and Siever R, *Earth*, Freeman, 2004 (inc. CD-ROM)0716717433

#### **CD-ROMs**

Plummer CC & McGeary D, *Interactive Plate Tectonics*, Wm. C. Brown, Dubuque, 1996  
Oxford Cambridge and RSA Examinations

**46** Reading List and Other Resources OCR GCE Geology

#### **Module F792: The Rock Cycle – Processes and Products**

Blatt H and Ehlers EG, *Petrology Igneous, Sedimentary and Metamorphic*, Freeman, 1982  
0716737434

Francis P, *Volcanoes: a planetary perspective*, Oxford University Press, 1993 1098540337

Knapp B, *Volcano*, Heinemann, 1990 ?

Scarth A, *Volcanoes*, UCL Press, 1994 089096654

Van Rose S, *Volcano*, Dorling Kindersley, 1992 ?

Adams, AE and MacKenzie WS, *Atlas of sedimentary rocks under the microscope*, Longman,  
1984 047027476X

Donaldson CH and MacKenzie WS, *Atlas of igneous rocks and their textures*, Longman,  
1982 04702733399

Hall A, *Igneous petrology*, Prentice Hall, 1996 0582230802

Leeder MR, *Sedimentology process and product*, Allen & Unwin, 1982 045510539

Mason R, *Petrology of the Metamorphic Rocks*, Kluwer Academic Publishers, 1990  
0045520275

Simpson B, *Rocks and Minerals*, Heinemann ?

Thorpe RS & Brown GC, *The Field Description of Igneous Rocks*, Wiley, 1991 047020118

Tucker ME, *Sedimentary petrology an introduction*, Blackwell Scientific, 2001 0632057351

Tucker ME, *Sedimentary Rocks in The Field*, Wiley, Chichester, 2003 0470851236

#### **Websites**

Exam Board: [www.ocr.org.uk](http://www.ocr.org.uk)

Geological Society of UK : [www.geolsoc.org.uk](http://www.geolsoc.org.uk)

Geology for beginners: [www.geologyrocks.co.uk](http://www.geologyrocks.co.uk)

Essex Rock & Mineral Society: [www.erms.org](http://www.erms.org)

Essex Field Club: [www.essexfieldclub.org.uk](http://www.essexfieldclub.org.uk)

#### **Journals:**

[www.InterScience.Wiley.com/Journal](http://www.InterScience.Wiley.com/Journal)

Nature

## **Physics**

**Exam Offered:** AQA Physics AS level (5451) / AQA Physics A2 Level (6451)

#### **Assessment Policy and Practice:**

Students are expected to undertake a minimum of 6 hours homework per week. In addition to set homework, which may take a variety of forms, students are expected to supplement class notes using a range of Physics texts. It is also expected that students will enhance their understanding of Physics by independent reading. Homework is marked in accordance with departmental policy. Throughout the course, students are expected to keep a log per module of all homework set, together

with grades awarded. Test results are also recorded here. Extended investigations and projects are included in each module.

You will be assessed on a day-to-day basis, periodically and transitionally

### **Day-to-Day:**

You will have an A4 exercise book where class work tasks and practical write ups will be recorded. Your formative understanding will be assessed by completing the summary questions and exam style questions in your text book. These will mainly be marked in class. You will keep an additional exercise book for independent study, which will mainly be peer and self assessed, but it will be checked occasionally by your teacher.

### **Periodic:**

There are several major pieces of Assessed Home Study tasks spread throughout each module. These consist mainly of banks of past exam paper questions which will be marked and commented on by the teacher. Practical work is a major component of Physics. You will complete several practice ISA exams which will be self-marked and/or peer assessed in preparation for the real ISA exam. There are opportunities for extended or self-directed tasks in each module. In addition you will be expected to complete a major project and give a presentation to your peers on Circular Motion in Y13. There will be a mock exam at the end of each module.

### **Transitional:**

You will sit the Unit 1 and Unit 2 AQA AS exams at the end of Y12 (Mock exams for Unit 1 and unit 2 will be sat in January and May respectively).

You will sit the Unit 4 AQA A2 exam in January and the Unit 5 exam in June of Y13.

## **Course Outline:**

- **Year 12**

| Autumn Term   | Spring Term   | Summer Term   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• Intro to the course</li> <li>• Start Unit 1 - Particles, Quantum Phenomena and Electricity.</li> <li>• Particles and Radiation</li> <li>• Electromagnetic Radiation and Quantum Phenomena</li> </ul> | <ul style="list-style-type: none"> <li>• Unit 1 Mock</li> <li>• Start Unit 2 - Mechanics, Materials and Waves</li> <li>• Mechanics</li> <li>• Materials</li> <li>• Waves</li> </ul> | <ul style="list-style-type: none"> <li>• Complete Unit 2</li> <li>• Revision</li> <li>• Study leave for Exams</li> <li>• Start Unit 4 – Momentum Section</li> </ul> |

|  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Current Electricity</li> </ul>  |  |  |
| <p>Suggested reading/resources</p> <p>FirstClass (online school community)</p> <p>AS Nelson Thornes textbook</p>                                     |  |  |
| <p>Key pieces of work</p> <ul style="list-style-type: none"> <li>• Unit 3: Internal Assessment – Investigative and practical skills (ISA)</li> </ul> | <ul style="list-style-type: none"> <li>• Unit 3: Internal Assessment – Investigative and practical skills (ISA)</li> </ul> | <ul style="list-style-type: none"> <li>• Mock exams for Units 1 and 2</li> </ul> |

• **Year 13**

| Autumn Term   | Spring Term  | Summer Term   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Continue Unit 4 – Fields and Further Mechanics</li> <li>• Revise Momentum</li> <li>• Circular Motion</li> <li>• Simple Harmonic Motion</li> <li>• Gravitation</li> <li>• Electric Fields</li> <li>• Capacitance</li> <li>• Magnetic Fields</li> <li>• Electromagnetic Induction</li> </ul> | <ul style="list-style-type: none"> <li>• Unit 4 AQA A2 Exam</li> <li>• Start Unit 5 – Nuclear Physics, Thermal Physics</li> <li>• Radioactivity</li> <li>• Nuclear Energy</li> <li>• Thermal Physics</li> <li>• Gas Laws</li> <li>• Molecular kinetic theory model</li> <li>• Astrophysics Option</li> </ul> | <ul style="list-style-type: none"> <li>• Mock Unit 5</li> <li>• Revision</li> </ul> |
| <p>Suggested reading/resources</p> <p>FirstClass (online school community)</p>  |  |   |

|                            |   |  |
|----------------------------|---|--|
| AS Nelson thornes textbook |   |  |
| Major pieces of work       | <ul style="list-style-type: none"> <li>• Circular Motion Project</li> <li>• Unit 6: Internal Assessment – Investigative and practical skills (ISA)</li> <li>• Mock Exam Unit 4</li> </ul> | <ul style="list-style-type: none"> <li>• Unit 6: Internal Assessment – Investigative and practical skills (ISA)</li> </ul> |

## **Wider Reading and Study Physics:**

Physics is a most exciting subject but when you're studying it for an exam you may not always find it so, because of work pressures. Nevertheless, try to extend your understanding by watching relevant TV programmes and reading New Scientist each week. There are lots of books that will show the exciting nature of physics; here are just some.

### **Reading Books**

“In search of Schrodinger’s Cat” (Quantum Physics and Reality), John Gribbin, 1984, Corgi Bantam Books 0553342533

“Genius – Richard Feynman and Modern Physics”, James Gleick, 1992, Little, Brown & Co Vintage Books 0679747044

“A Short History of Nearly Everything”, Bill Bryson, 2004, Black Swan

“The Cartoon Guide to Physics (Paperback)” by Larry Gonick, 1991, HarperCollins 0062731009

“A Tour of the Subatomic Zoo: A Guide to Particle Physics” Cindy Schwarz, 1997, AIOF 1563966174

“Thirty Years That Shook Physics: Story of Quantum Theory” George Gamow, 1986 Dover Publications 048624895X

### **Recommended reference textbooks (Y12 and Y13)**

Physics (3<sup>rd</sup> Edition), Dobson K, Grace D and Lovett D, Collins, 978-0-00-726749-1

Understanding Physics for Advanced Level (3<sup>rd</sup> Edition), Breithaupt J, Stanley Thornes, 0-7487-1579-7

Advanced Physics, Adams, S and Allday J, Oxford University Press, 0-1991-4680-2

*Institute of Physics book review: 5/5 Excellent*

Heinemann Science: Advanced Physics 2<sup>nd</sup> Edition, Fullick P, 0-4355-7097-8

*Institute of Physics book review: 4/5 Very Good (about*

Advanced Physics, Duncan T and John Murray, 0-71955199-4

*(IOP 3/5)*

Advanced Physics, Gibbs K, Cambridge University Press, 0-521-39985-8

Bath Advanced Science Physics (2nd edition), Hutchings R, Nelson, 0-17-438-7318  
(IOP 3/5)

*NOTE: There are inspection copies of most of these books in the Physics preparation room.*

### **Textbooks provided by Physics Department**

AQA Physics A (AS), Breithaupt J, Nelson Thornes, 978-0-7487-8282-6  
AQA Physics A (A2), Breithaupt J, Nelson Thornes, 978-0-7487-8281-9

### **Websites:**

Exam Board: [www.aqa.org.uk](http://www.aqa.org.uk)

Nelson Thornes online resource: [www.nelsonthornes.com/learningspace/](http://www.nelsonthornes.com/learningspace/)

Institute of Physics: [www.iop.org](http://www.iop.org)

## **Science in Society**

**Exam Offered:** AQA AS Science in Society

### **Assessment Policy and Practice:**

You will be assessed on a day-to-day basis, periodically and transitionally

#### **Day-to-Day:**

You will need to reflect and comment on your homestudy before submitting it to the teacher for assessment. You will receive comments and a grade for this work. You will keep an exercise book for independent study in which work will be peer and self assessed.

#### **Periodic:**

You will receive comments and grades for your investigative and practical skills. Research work will be self and peer assessed. You will receive a progress report, a mock report and 2 master learner current performance reports per year.

### **Transitional:**

You will sit the Unit 1 AS exam at the end of Y12 (Mock exams for Unit 1 will be sat in January and May). Unit 2 will be internally assessed.

### **Course Outline:**

- **Year 12**

| Autumn Term   | Spring Term  | Summer Term  |
|---|--|--|
| <ul style="list-style-type: none"><li>• Exploring scientific issues</li><li>• Germ theory of disease</li><li>• Transport</li><li>• Medicines</li><li>• Ethics in medicine</li></ul> | <ul style="list-style-type: none"><li>• Exploring scientific issue</li><li>• Reproductive choices</li><li>• Radiation</li><li>• Evolution</li><li>• The Universe</li></ul> | <ul style="list-style-type: none"><li>• Exploring scientific issues</li><li>• Are we alone?</li></ul>                                      |
| Suggested reading/resources<br><br>Popular science texts<br><br>New Scientist<br><br>FirstClass (online school community)   | Popular science texts<br><br>New Scientist<br><br>FirstClass (online school community)   | Popular science texts<br><br>New Scientist<br><br>FirstClass (online school community)   |
| Key pieces of work<br><br>Reading and writing about science   | <ul style="list-style-type: none"><li>• A critical account of scientific reading</li><li>• A study of a topical scientific issue</li></ul>                                 | <ul style="list-style-type: none"><li>• A critical account of scientific reading</li><li>• A study of a topical scientific issue</li></ul> |

### **Wider Reading and Study Science in Society:**

New Scientist Magazine

Newspapers

Internet

Popular Science books :-

A Short History of Nearly Everything      Bill Bryson   Broadway Books  
076790818X

The Double Helix      James D. Watson   Simon & Schuster   074321630X

The Selfish Gene      Richard Dawkins   The University Press   0192177737

The Physics of Star Trek      Lawrence M. Krauss   Perseus Books Group  
0465002048

A Brief History of Time      Stephen Hawking   Bantam Books   0553346148

Y: The Descent of Men      Steve Jones   Little Brown Book Group  
0618139303

Aspirin      Diarmuid Jeffreys   St. Martins Pr   1582346003